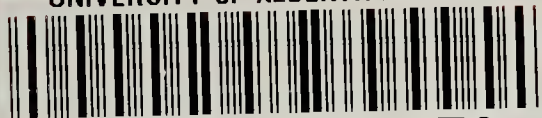


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# BLUE JAY

SCIENCE

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The *Blue Jay*, founded in 1942 by Isabel M. Priestly, is a journal of natural history and conservation for Saskatchewan and adjacent regions. It is published quarterly by the Saskatchewan Natural History Society, Box 1784, Saskatoon, Saskatchewan, S7K 3S1. CN ISSN 0006-5099.

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**CORRECTION in “MEMORIES OF GROUSE”,  
by Jerrold Armstrong.**

Blue Jay, June 1983, 41(2):116.

The last sentence of the third paragraph should read as follows: “The cocks were displaying and feigning combat; the hens seemed to be unconcerned, indifferent.”



# NATIVE CACTI OF SASKATCHEWAN

VERNON L. HARMS, The W. P. Fraser Herbarium, University of Saskatchewan, Saskatoon, Saskatchewan. S7N 0W0

## Introduction

This article attempts (1) to briefly introduce the cacti as a novel and interesting plant group, and (2) to present a taxonomic treatment of Saskatchewan's native cacti, with descriptions, habitat information, and distribution maps of verified records in the province.

The Cacti are unique plants that long have caught the popular fancy. The common name "cactus", is derived from the Greek word "kaktos" meaning "a prickly plant", making it an appropriate designation for plants of the family Cactaceae (= Opuntiaceae). Most North Americans think of cacti as warm-desert plants of the American Southwest and Mexico, where they are

indeed most common and diverse in numbers of species, and they often are surprised to find that there are native cactus species growing as far north as Saskatoon and North Battleford, Saskatchewan, and the Peace River country of Alberta and British Columbia.

Not all cacti are strictly desert plants, although most are indeed xerophytes (i.e. drought-resistant plants that are characteristic of relatively dry sites). In the Americas, members of the cactus family may be found in a variety of local habitats, and geographically ranging from Patagonia in southern South America, northward to our Canadian Prairies. Various species are even native



*Prickly Pear Cactus.*

*Bob Godwin*



to the tropical rain-forests, where they often are epiphytic (i.e. growing on other plants). Some well known examples of tropical cacti that are commonly grown as household ornamentals, are the Christmas and Easter Cacti (*Zygocactus* and *Schlumbergia* spp., and their hybrids). Authorities differ considerably as to the number of "good genera" into which to group the members of the cactus family (conservatively about 30-50, although some recognize up to 120), as well as the total number of included species best recognized (usually estimated as between 1500 and 2000).

An amazing variety of plant body-forms have evolved among cacti, — e.g., globular, cylindrical, columnar, flattened, jointed, branched or not, and single-stemmed or clustered from the base. Characteristically, in all succulent xerophytes, the main adaptation of the body-form to reduce water loss has been development of a decreased surface to volume ratio. Among cacti, this has involved the development of very fleshy stems and the reduction or complete loss of leaves. Only members of the more tropical, less xerophytic, and mostly shrubby, subfamily Pereskioideae, have "normal" leaves that persist. The species of subfamily Opuntioideae, including the prickly-pear cacti, have small awl-shaped juvenile leaves that soon fall off. Leaves are entirely lacking in the large subfamily Cereoideae, which includes the pincushion and barrel cacti.

With leaves absent, or reduced and short-lived, photosynthesis (food manufacturing) occurs instead in green cells of the stem outer layers. Much of the inner volume of succulent cactus stems is composed of storage cells containing mucilaginous materials with strong water-retaining capability. The tough waxy stem surfaces greatly retard water loss by evaporation. The remarkable efficiency of this latter feature is demonstrated by the great difficulty plant collectors have in properly

drying intact cactus specimens when using normal plant-pressing techniques. Instead, to obtain satisfactory dried specimens, cacti need special handling by first slicing the stems and fruits to expose the inner tissues, or killing them with alcohol or some other preservative before press-drying.

Spine-clusters called "areoles" are unique structures of cacti. Although other kinds of succulent plants often bear spines, these are not clustered in areoles. Cactus areoles are borne spirally arranged on the stems, positioned directly above the "leaves" or (in subfamily Cereoideae) the potential location of the leaves. The spine (etc.) structures in areoles thus represent parts developed from the stem axillary buds. In some cacti (including our native Purple Ball Cactus), the areoles are borne on small cone-shaped or globular protuberances. In some others, they may occur on spiralling or nearly vertical stem ridges. Often distinguishable within cactus areoles, are long central spines and somewhat shorter radial (or marginal) spines. Besides the obvious, long, firm spines, the areoles of many cacti (e.g. prickly pears and chollas) may also bear numerous, small, soft-flexible, barbed bristles called "glochids", that, although inconspicuous, are probably even more troublesome to humans contacting these cacti than the former. Frequently, wooly hairs also occur in the areoles.

The flowers of cacti are solitary, usually large and conspicuous, and often strikingly beautiful. The flowering periods tend to be rather short. Cactus flowers are botanically anomalous in combining such purportedly primitive characteristics as numerous, spirally arranged, separate stamens and perianth parts (i.e. sepals and petals), together with such evolutionarily advanced features as inferior and multicarpellate ovaries with parietal placentation (i.e. attachment of ovules in several to many rows along the sides of



a single ovary chamber). Cactus flowers are radially symmetrical and bisexual (i.e. with stamens and pistils both present).

The perianth is not sharply differentiated into sepals and petals. Rather the outer perianth-parts, which are more greenish and sepal-like, intergrade with the inner perianth-parts, which are variously coloured and petal-like. The stamens are very numerous and spirally arranged, sometimes showing some basal fusion of the long filaments into groups. The pistils are composed of several to many fused carpels, with as many stigmas as carpels. The inferior ovary is 1-chambered with the numerous ovules borne in several to many vertical rows along the sides. The perianth-parts and stamens arise from above the (inferior) ovary (= epigynous) and, in subfamily Cereoideae, from the rim of a cylindrical floral tube (= hypanthium) that extends above the ovary. Such an extended floral tube is present in our Saskatchewan native Purple Ball Cactus (see figure 1), but is absent or very short in our Prickly Pear species (see figure 2). The cactus ovary matures into a berry-type fruit, ranging from quite fleshy to rather dry and leathery. Areoles often occur even on the outer surfaces of ovaries (later fruits) and sometimes on the floral tubes extending above the ovaries. (See figures 1 to 3 for illustrations of vegetative and flower parts of cacti).

Three native species of cacti occur in Saskatchewan: (1) the Purple Ball or Pincushion Cactus (*Mamillaria vivipara*), (2) the Plains or Many-spined Prickly-pear (*Opuntia polyacantha*), and (3) the Brittle Prickly-pear (*Opuntia fragilis*). These may be identified by means of the diagnostic characteristics given in the following key. (In using the key, choose between the first pair of alternative leads, "1a" vs. "1b"; then if your choice is "1b", choose between the subsequent pair of leads, "2a" vs. "2b").

## Identification Key to the Native Species of Cacti in Saskatchewan

1a. Stem globular or pincushion-like, solitary or tufted only from base, unbranched above, not jointed into pad-like segments, covered with cone-shaped protuberances (tubercles), each tipped by an areole (spine-cluster); leaves entirely lacking; spines more than 12 per areole; areoles with dense wooly hairs, but lacking glochids (small, sharp, soft-flexible, barbed bristles); flowers borne between the tubercles; perianth-parts narrowly lance-shaped, less than 1 cm wide; the outer greenish perianth-parts ciliate-fringed; inner perianth-parts purplish-red; floral tube (hypanthium) distinct and elongated, extending somewhat above ovary; berry-fruit juicy-fleshy, non-spiny, wedged between the tubercles . . . . .  
1. *Mamillaria vivipara*.

1b. Stems often branched above base, conspicuously jointed into a series of more or less flattened pad-like segments separated by much-constricted joints; stem surfaces lacking cone-shaped tubercles; awl-shaped juvenile leaves present on very young stem pads but soon falling off; spines fewer than 12 per areole; areoles with tufts of glochids at base of longer spines; flowers borne from areoles on edges of young upper stem-segments (pads); perianth-parts, except outermost series, ovate to triangular or fan-shaped, over 1 cm wide; the outer green perianth-parts not ciliate-fringed; inner perianth-parts yellow, often tinged with green, tending more orange or pinkish-red with age and toward flower-centers; floral-tube above ovary absent or very short; berry-fruits relatively dry, with spiny areoles and often awl-shaped juvenile leaves on surfaces . . . . . (see 2a vs. 2b).

2a. Pads (stem-segments) mostly less than 5 cm long, less than 2.5 cm broad, not strongly flattened, at least half as thick as broad; green to often somewhat reddish, the terminal ones quite readily



detaching; areoles crowded on pads, mostly less than 8 (–10) mm apart, with dense, distinctly white, wooly hairs; longer spines seldom more than 5 per areole, the largest spines mostly 2 cm long or shorter; the small young spines distinctly barbed (under 20x magnification); glochids relatively few; pad surfaces between areoles usually becoming strongly wrinkled on dried specimens; inner perianth-parts usually pale-yellow when fresh; stigmas 2 mm long or less . . . . . 2. *Opuntia fragilis*.

2b. Mature pads mostly over 5 cm long and over 3 cm broad, strongly flattened, over (2–) 4 times as broad as thick, not readily separable, usually bright-green;

areoles more distant on pads, (8–) 10-13 mm\* apart, with wooly hairs more sparse and whitish to mostly rusty-tinged; spines often more than 5 per areole and over 2 cm long; the short younger spines scarcely if at all barbed; barbed glochids much more abundant; pads less strongly wrinkling upon drying; inner perianth-parts usually bright-yellow when fresh; stigmas over 2 mm long . . . . . 3. *Opuntia polyacantha*.

\* ranges given in measurements denote normal variation in size; numbers in parenthesis represent extremes that have been found.

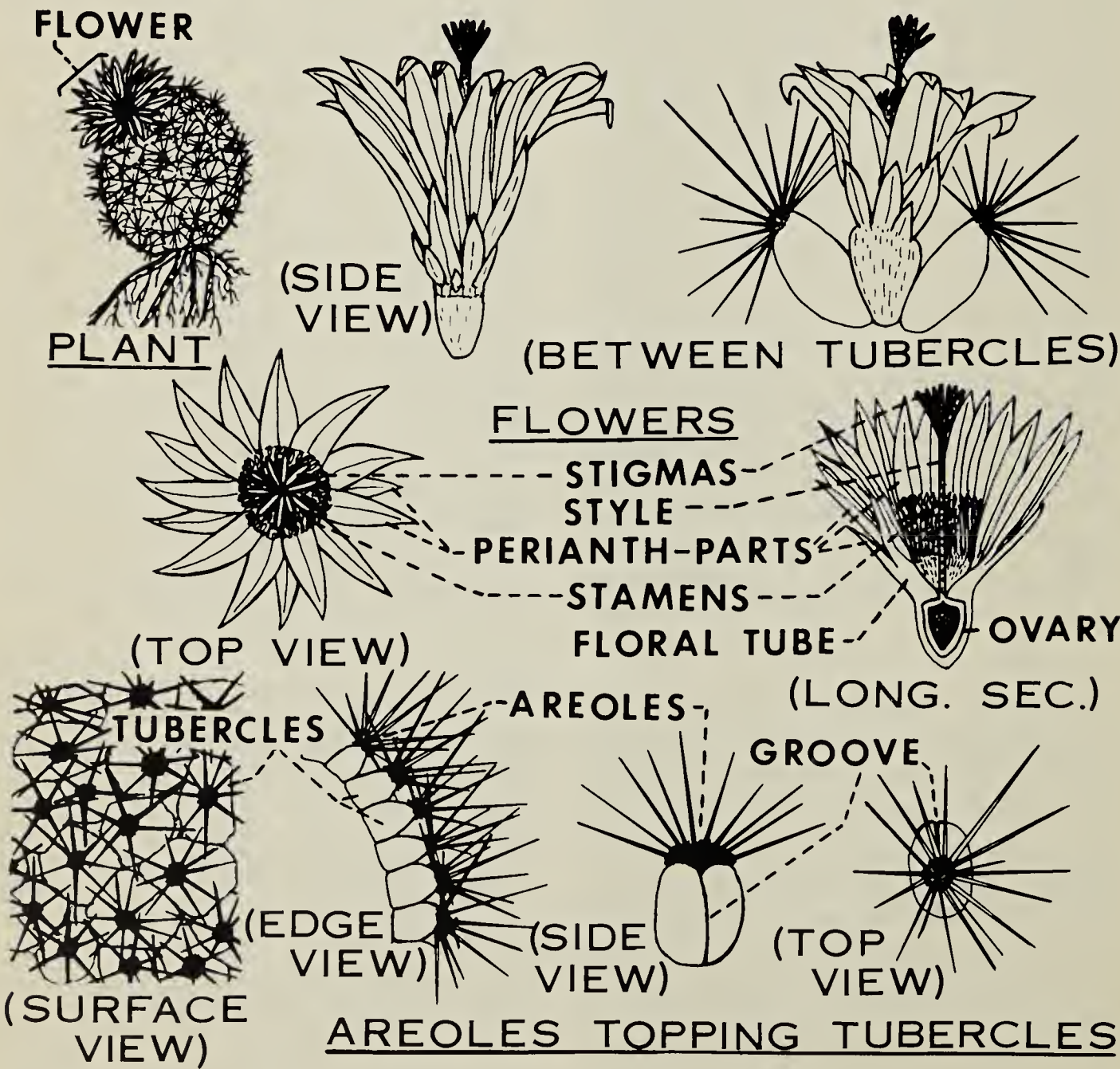


Figure 1. Purple Ball Cactus (*Mamillaria vivipara*).



## Descriptions of Native Cactus Species

1. PURPLE BALL, PINCUSHION, or NIPPLE CACTUS. *Mamillaria vivipara* (Nutt.) Haw. [*Coryphantha vivipara* (Nutt.) Britt. & Brown; *Neomamillaria vivipara* (Nutt.) Britt. & Rose].

The plants occur solitarily or in clusters of 2-10. The stems are globular or pincushion-like (more or less vertically flattened), 3-5 (–8) cm high, about 5 (3-7) cm in diameter, covered with prominent cone-shaped protuberances (tubercles) about 4-10 (–15) mm long, each grooved on the upper surface and topped by an areole of spines. The areoles mostly have (1–) 3-6 central spines and 14-18 (–20) radial spines, all straight and rigid, reddish-brown to whitish, 1-2 cm long, the radial ones somewhat shorter than the long central spines. Dense, white, wooly hairs are usually present in the areoles, but glochids are lacking. Leaves are entirely absent, even on young cacti. The conspicuous flowers are 3-4 cm long, 1.5-3 (–5) cm wide, borne between tubercles (actually just above the groove of a tubercle) on upper part of stem. A distinct funnel-shaped floral-tube (= hypanthium) is present, extending somewhat above the inferior ovary. The perianth-parts are numerous, narrowly lance-shaped, 15-30 mm long, and 2-5 (–8) mm wide; the outer ones are green, sepal-like, and ciliate-fringed; the inner ones are petal-like, bright purplish-red, varying to sometimes pale purplish-pink or salmon-pink. Stamens are numerous, the filaments pinkish-red or yellowish, and anthers yellow, forming the yellow flower-centers. Pistils are compound, of 6-15 fused carpels; stigmas 1.5-3 mm long, equal in number to carpels. The berry-fruit is quite juicy, globular to ovoid, 10-15 mm long, tightly wedged between stem tubercles, smooth, lacking spiny areoles, pale-green becoming brownish with age, sweet and edible. Seeds are 1.2-1.5 mm long, 1.5-

2 mm broad, with surfaces light-brown and reticulately pitted, and the hilum (seed-stalk scar) appearing lateral. (See figure 1).

These plants grow on dry, usually quite sandy, exposed hillsides and ridges in the grassland region of southern Saskatchewan, from the International Boundary, north to Saskatoon (see Map 1). The short-lived flowers appear in early summer (June), usually opening only in the mornings; the berry-fruits ripen by fall.

2. BRITTLE PRICKLY-PEAR. *Opuntia fragilis* (Nutt.) Haw.

The plants are low-growing, prostrate-spreading to more or less decumbent (i.e. terminal pads turned upward), often branching (two pads arising from the top of one below), sometimes forming dense mats to 5 dm wide and 0.5-2 dm high. The stems are conspicuously jointed, with the segments (pads) obovate to elliptical or ovate in outline, (1.5–) 2-3 (–5) cm long, 1-2.5 (–3.5) cm broad, somewhat flattened to nearly circular in cross-section, 1-2 cm thick, at least one half as thick as broad. The terminal pads are readily detached, facilitating dispersal by animals. Areoles are mostly distanced less than 8 (–10) mm apart on stem pads, each armed with (2–) 3-7, strongly divergent, yellowish to brownish, straight spines, 1-2 (–3) cm long; the smaller young spines are barbed. Areoles also commonly bear dense, coarse, white-wooly hairs, and only a few yellowish to whitish-grey glochids. Stems, upon drying, tend to strongly contract between areoles; thus dried herbarium specimens usually appear much wrinkled. The juvenile leaves are subulate (awl-shaped), 2.5-3.5 mm long, and soon fall off.

The flowers are conspicuous, 2.5-5 cm long and broad. The perianth-parts (excluding outer bract-like series) are mostly triangular or ovate, 2-3.5 cm long, and 1.5-2.5 (–3.5) cm wide. The outer perianth-parts are sepal-like and



greenish, edged with yellow; the inner petal-like perianth-segments are pale-yellow, tending to pale-pinkish or orange with age especially toward the flower centers. Stamens are numerous, with the filaments yellowish to often reddish. Pistils are compound, with 10 carpels and 10 oblong stigmas, mostly 1.5-2 mm long. The fruit is a dry, ovoid, spiny berry, 1-2 cm long, about 1 cm in diameter, greenish when young, becoming tannish when mature. Seeds are numerous, 5-7 mm long, yellowish, and irregularly shaped. (See figure 2).

Brittle Prickly-pear grow on warm, dry, sandy, exposed hillsides, in the general grassland region of southern Saskatchewan, from the International Boundary, north to the Saskatoon and Battleford areas (see Map 2). They often are locally associated with, but almost always less frequent than, plants of the Plains Prickly-pear. The flowers bloom in June, but many plants do not seem to produce flowers, at least in a given year. The fruits mature over the summer to ripen in fall, although many appear not to develop after flowering.

3. PLAINS OR MANY-SPINED PRICKLY-PEAR. *Opuntia polyacantha* Haw. [ *Opuntia missouriensis* DC.; *O. columbiana* Griffiths; *O. polyacantha* var. *borealis* Coult.; var. *microsperma* Engelm. & Bigel.; var. *platycarpa* (Engelm.) Coult. ]

The plants are low-spreading, more or less prostrate to 2 dm high, of several to many jointed segments (pads), often forming large, prostrate mats or clumps. The larger stem-pads are broadly obovate or nearly circular in outline, 5-13 cm long, 4-10 cm broad, to about 1 cm thick, strongly flattened, at least 4 times broader than thick, not readily disjointing, bright-green to bluish-green. The areoles are about 1 cm (8-13 mm) apart on mature stem-pads, with longer spines (3-) 5-10 per areole, straight, creamish-white or reddish-brown, 1-5 cm long and unflattened, about 0.5 mm in diameter at base; the smaller young spines are scarcely, if at all, barbed. Areoles also bear clusters of tawny, barbed, bristle-like glochids, and whitish to brownish-tawny wooly hairs.

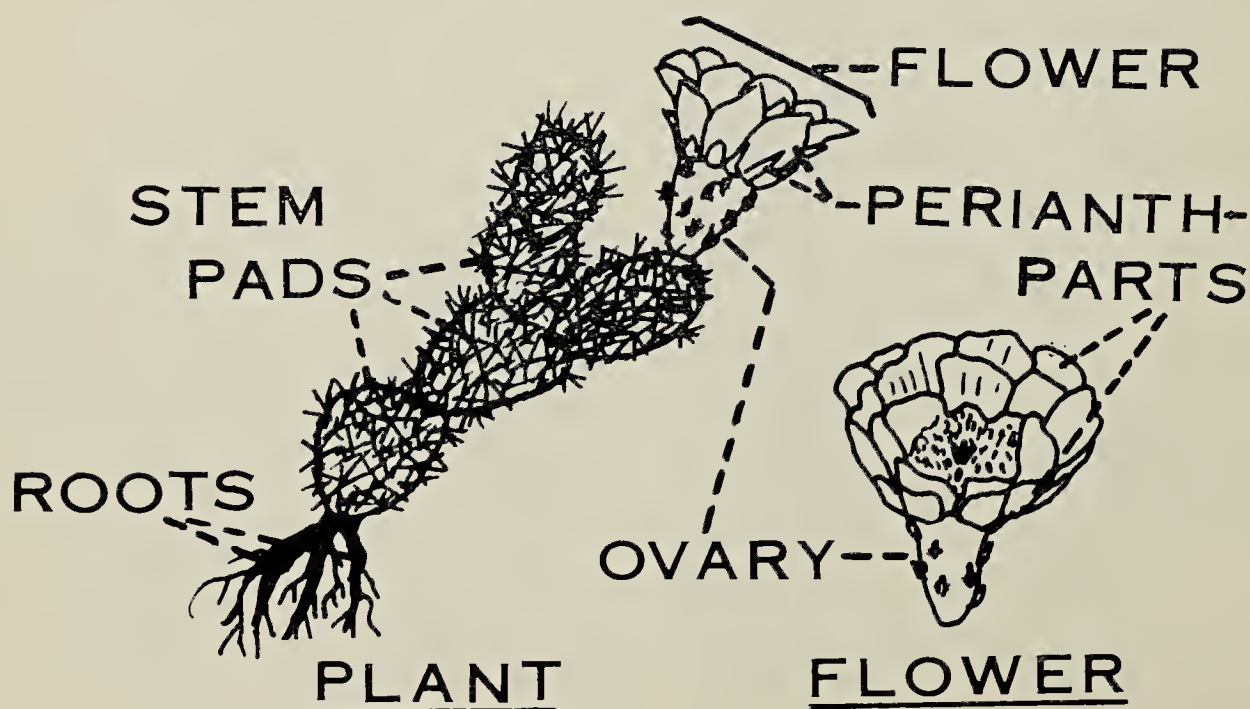


Figure 2. Brittle Prickly Pear (*Opuntia fragilis*).



The flowers are large and showy, 4-8 cm broad, and 2.5-6 cm long, waxy-appearing, borne from areoles along the margins of young upper pads. The perianth-parts are ovate to triangular, 2.5-5 cm long and 1.5-3 cm broad. The outer perianth-parts are greenish and sepal-like; the inner perianth-parts are petal-like and pale-yellow, tending toward pinkish or reddish-orange with age at bases and flower centers. Stamens are numerous, the filaments yellowish to often pinkish-red. The pistils are compound with 10-15 carpels; the stigmas are lanceolate to oblong, 2.5-4 mm long, as many as the carpels. The fruit is a dryish, quite leathery berry, globular to oblong or more or less obovoid, 2-3 cm long, tan to brown, with areolar glochids and spines. Seeds are numerous, 5-6 mm

long, irregularly shaped, yellowish to whitish. (See figure 3).

Plains Prickly-pear grow on warm, dry, usually quite sandy or gravelly, exposed and often denuded plains, hill-slopes and ridge-summits, in the grassland region of southern Saskatchewan, north to the Saskatoon and Battleford areas (see Map 3). The flowers appear in June, and fruits mature by fall. This is our most common cactus, locally frequent even as far north as Saskatoon. In some sand-hill areas, its frequency appears increased by overgrazing. Boivin's statement that this species is more southern in the Prairie Provinces than the Brittle Prickly-pear seems incorrect for Saskatchewan, since even at the northernmost known stations where they coexist, the Plains Prickly-pear is more abundant.<sup>1</sup>

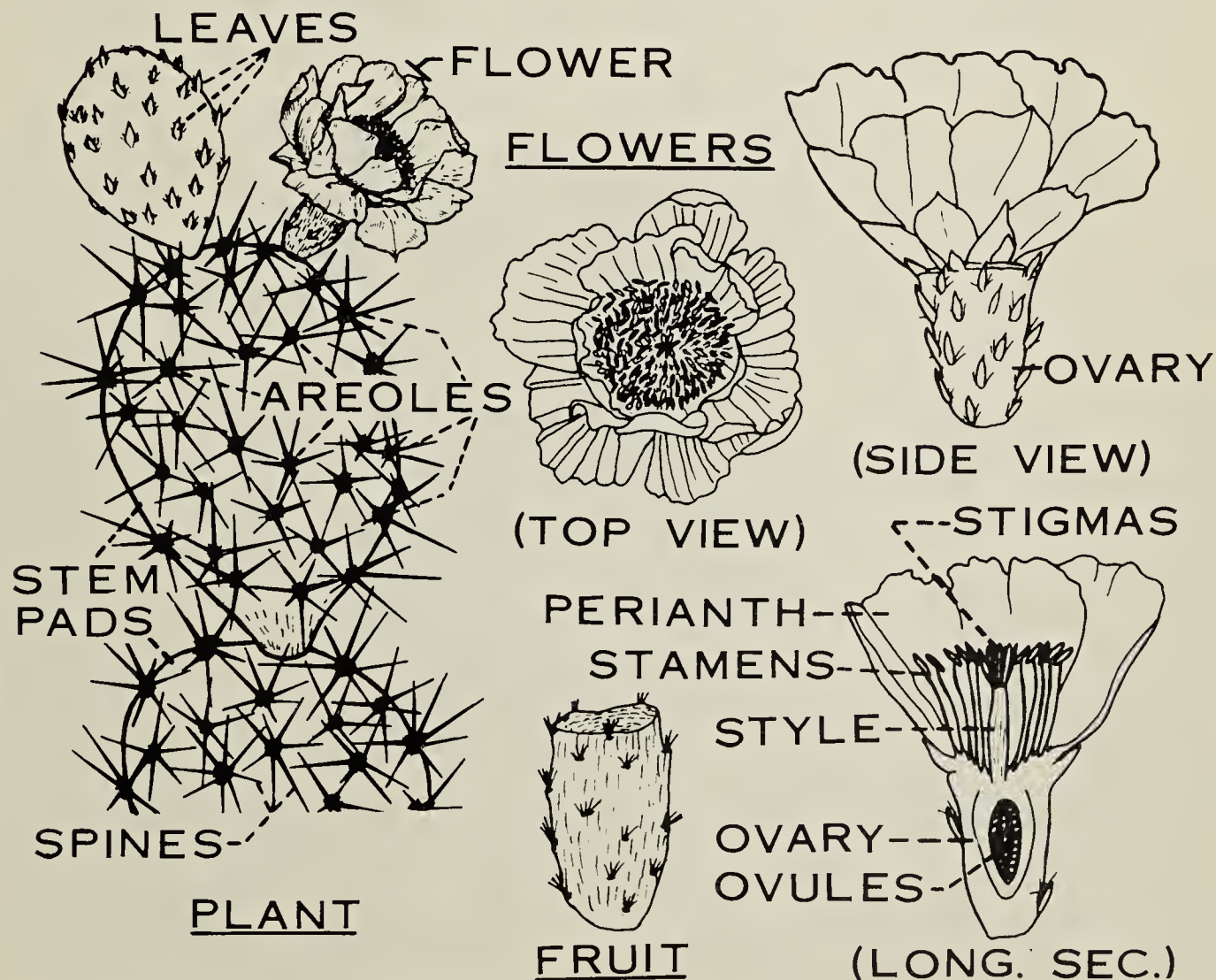


Figure 3. Plains Prickly Pear (*Opuntia polyacantha*).



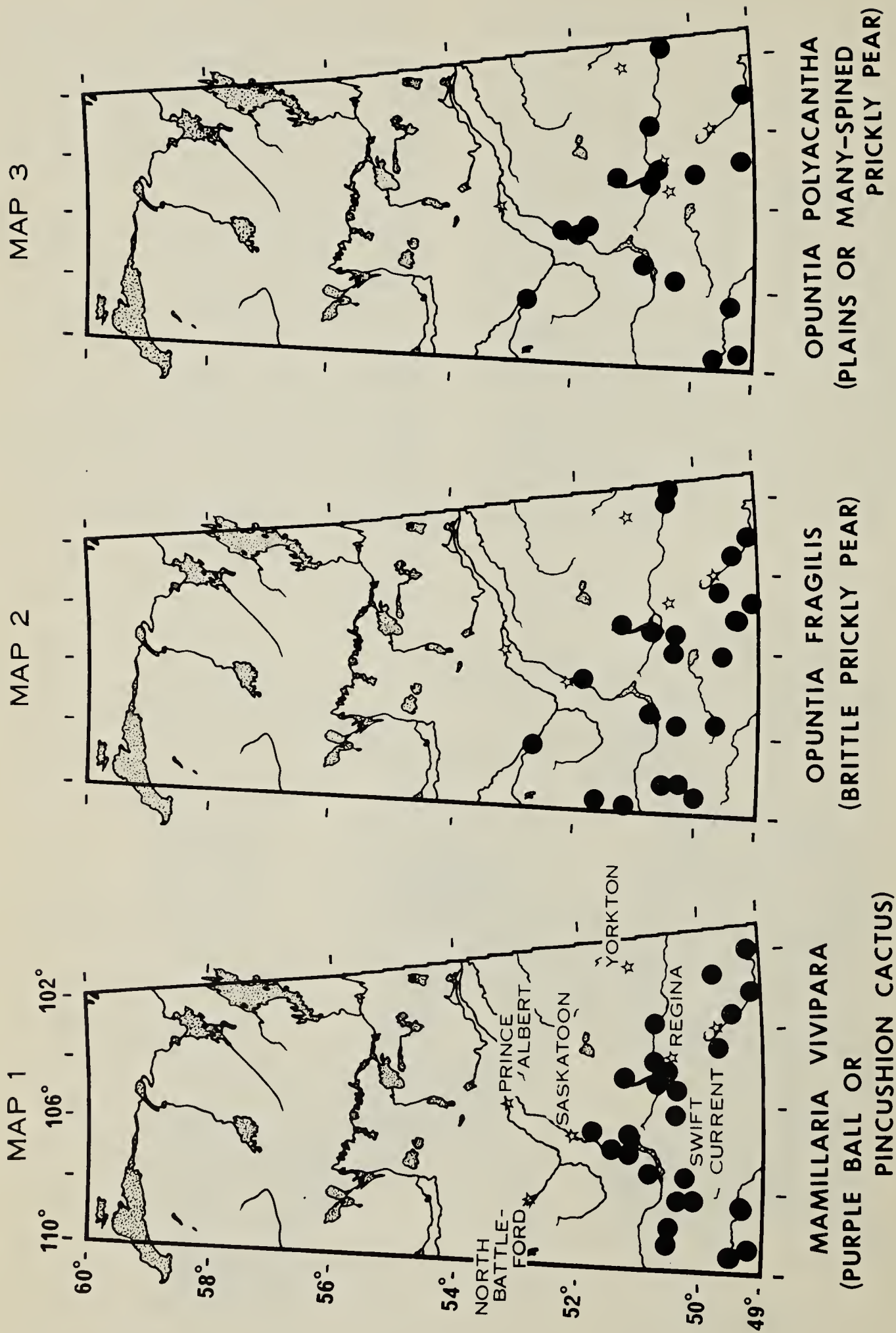


Figure 4. Range of Saskatchewan cacti.



## Edibility of Native Cacti

Presettlement Indians, white pioneers, and even modern-day people have used the berry-fruits of cacti as a food source. The edible part is the fleshy pulp between the firm outer coat and seeds. The sweet juicy berries of our Purple Ball Cactus are edible. But the unusually dry, leathery fruits of the two prickly-pear species that are native to Saskatchewan make them less edible. The younger fleshy stem-pads of prickly-pear cacti have also been used for food after peeling off the outer coat along with the areolar spines (or else burning off the spines and glochids) and then roasting, boiling, or frying the internal parts. Prickly-pear cacti have also been used as an emergency food source for cattle, after burning off the surface spines and glochids.

## Saskatchewan Distribution

Maps 1, 2 and 3 show the known documented records in Saskatchewan of the three native cactus species. The

dots on the provincial maps are based entirely on personally verified herbarium specimens filed in Saskatchewan and Ottawa herbaria. Thus, the full distributional picture for these cacti in the province is likely quite incomplete. Information about other locality records to help fill in the Saskatchewan distributions would be welcomed by the author. Better distributional information seems especially needed for eastern Saskatchewan. Brittle Prickly-pear might even be looked for in the southern fringes of the boreal forest in dry rocky clearings, as it has been reported from such habitats in eastern Manitoba.<sup>2 3</sup>

<sup>1</sup> BOIVIN, B. 1967. Flora of the Prairie Provinces, Part I. Provancheria No. 2, Laval University, Quebec.

<sup>2</sup> SCOGGAN, H. J. 1957. Flora of Manitoba. National Museum of Canada Bulletin No. 140.

<sup>3</sup> ———, 1979. Flora of Canada, Part IV. National Museum of Natural Sciences Publ. in Botany No. 7(4). National Museums of Canada, Ottawa.



*Purple Ball Cactus.*

Gary W. Seib



## WHITE ADDER'S-MOUTH AND OTHER UNUSUAL PLANTS

BERNARD DE VRIES, Fort Qu'Appelle  
Herbarium, Fort Qu'Appelle, Saskat-  
chewan. SOG 1S0

Reading Donald Hooper's amusing account on how to lead a fisherman to water and discover a rare orchid in the process, brought to mind a similar, although less dramatic find in 1972 when the author found the delicate orchid White Adder's-mouth (*Malaxis monophyllos* (L.) Sw. var. *brachypoda* (Gray) Morris & Eames) in a small Willow bog in Little Boggy Creek near Runnymede.<sup>1</sup> This collection precedes the earliest reference given for this orchid in Saskatchewan by two years.<sup>2</sup> A later check of this bog turned up another unusual plant, namely the Small Primula (*Primula mistassinica* Michx.) a widespread but easily overlooked species.

A sharp eye for the unusual and an inquisitive mind makes for successful botanizing with the unexpected turning up, as was demonstrated during study of the Flora of Duck Mountain Provincial Park in 1982. Among the more common plants were observed, and in some instances collected, Bog Adder's Mouth (*Malaxis paludosa* (L.) Sw.), Butterwort (*Pinguicula vulgaris* L.), Thick-leaved Grape Fern (*Botrichium multifidum* (Gmelin) Rupr. var. *multifidum*) and Tall Yellow Lady's Slipper (*Cypripedium calceolus* L. var. *pubescens* (Willd.) Correll).

<sup>1</sup> HOOPER, D. F. A new Saskatchewan record for Adder's-Mouth. *Blue Jay* 41(1):9-10.

<sup>2</sup> MAHER, R. V., G. W. ARGUS, V. L. HARMS and J. H. HUDSON. 1979. The Rare Vascular Plants of Saskatchewan. National Museum of Natural Sciences. Syllogeus No. 20. Ottawa, Canada.



Large Yellow Lady's-slipper. W. C. Harris



# THE RARE EPIRRHANTHIS GEOMETER MOTH AT THE PAS, MANITOBA

WALTER KRIVDA, Box 864, The Pas, Manitoba. R9A 1K8

There are many kinds of Geometer Moths known. They are worldwide in distribution. Each area has its own particular kinds. Many of the species are tied to certain environments involving food plants and soils. The *Epirrhantis* Geometer is a northern species in Manitoba. It occurs around Hudson Bay and is, therefore, a cold zone species.

In 1955 when I was first teaching at Gillam, Manitoba — mile 326 on the Hudson Bay Railway, a good number of *Epirrhantis* came to incandescent lights at night at the school. Some 15 specimens were collected on dates between 15-23 May 1955. These are in the author's collection in The Pas. There are

also a few specimens collected in Lynn Lake in May, 1958.

In over 30 years of moth collecting in Manitoba, I have found this nowhere else before. This last season, however, a single specimen came to my back porch light on the night of 13 May 1982. This is a unique record for The Pas area. It proves that this subarctic species reaches as far south as The Pas in the province. No other specimens are known. It may well be at its most southern range at The Pas. Its full scientific name is *Epirrhantis substriataria*. It has no common English name. The illustrated specimen is the unique one from The Pas.



*Epirrhantis substriataria*, The Pas, Manitoba; 13 May 1982; collector W. Krivda.



# GROWING WHITEFISH FINGERLINGS IN REARING PONDS

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Being the mainstay of commercial fish production, whitefish is one of the most economically important fishes in Saskatchewan. The commercial fishermen (now about 14 hundred in total) harvested about 2.3 million kg of whitefish annually from some 200 lakes over the past four decades. However, production has dropped considerably in recent years. The current annual harvest is about 1.7 million kg.

Overfishing and habitat deterioration appear to have severely affected the whitefish stocks in a number of lakes; in some, the fishery has virtually collapsed.

In order to find a better way to restore a collapsed fishery and to enhance a declining fish population, the Fisheries Branch recently carried out a pilot project of growing whitefish in rearing ponds for later release into problem lakes. The immediate objective of the project was to determine the growth and production of whitefish fingerlings in the rearing ponds. This article summarizes the findings of the study.

## The Rearing Ponds

Figure 1 shows the location of the three lakes that were used as rearing ponds in 1981 and 1982 (only one pond was used in the second year). The ponds varied from 2.4 to 225 ha in area and 1.4 to 1.8 m in mean depth.

Turtle Lake Pond, located on a sheep ranch, was more fertile than the two northern ponds which drain a forest-muskeg watershed. The biomass of bottom organisms (an important food source for fingerlings) was an order-of-

magnitude more abundant in Turtle Lake Pond than in the two northern ponds.

Surface water temperatures for all three ponds from June to August ranged from 13 to 21°C with an overall average of 18°C.

Fathead Minnows and Brook Sticklebacks were very abundant in McMahon Pond and Brook Sticklebacks in Kallemeyn Pond. However, the stickleback population in Kallemeyn Pond was reduced considerably in 1982 due to winterkill. Native fish were not found in Turtle Lake Pond.

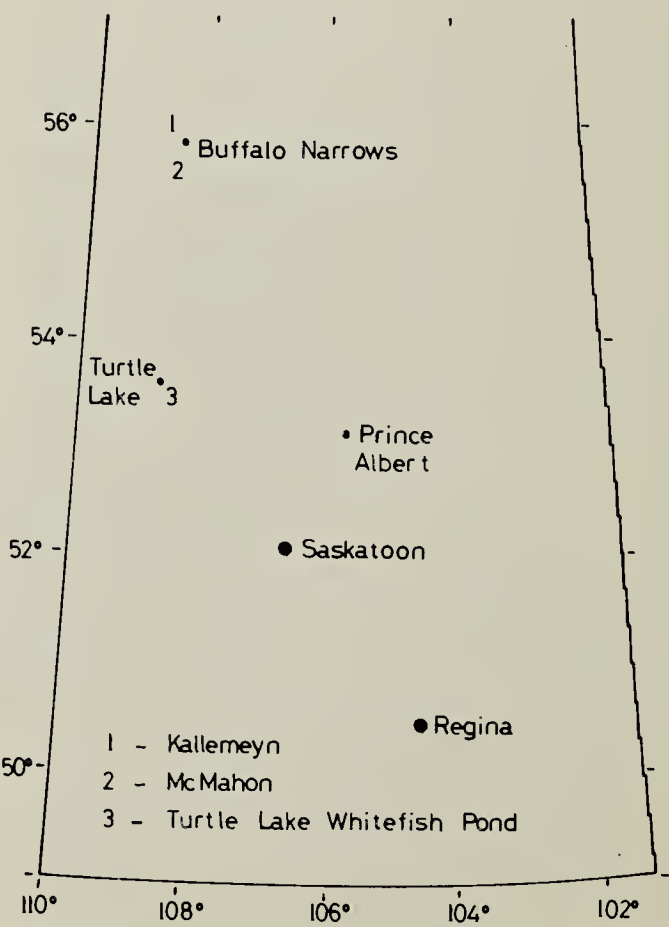


Figure 1. Location of 3 whitefish rearing ponds in Saskatchewan.



**Stocking of Fry**

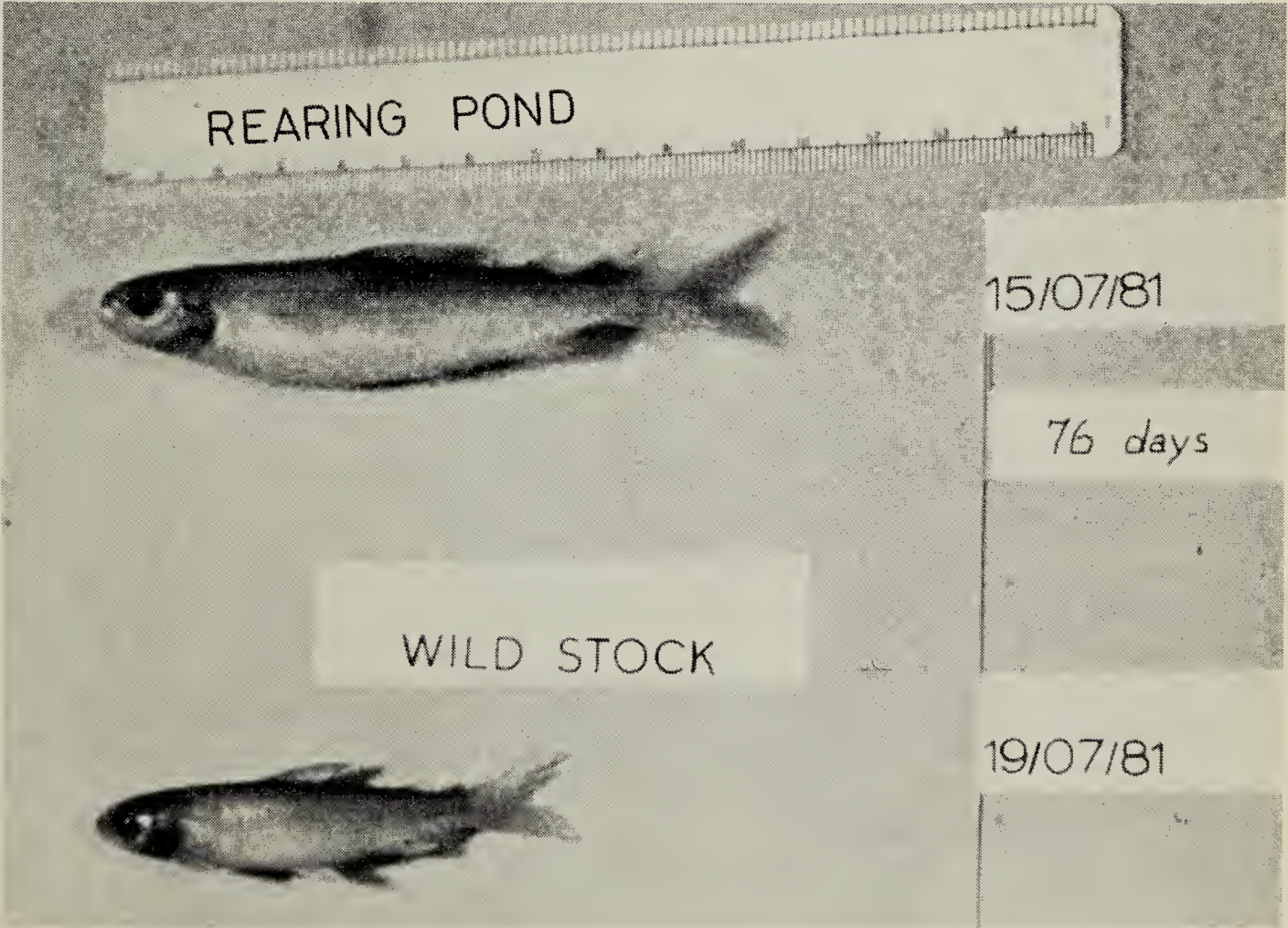
Whitefish fry from the Qu'Appelle Fish Culture Station were stocked into all three ponds on 30 April 1981. In 1982. Kallemeyn Pond only was stocked on 6 May. Stocking into the two northern ponds was done through ice, as the ponds were still covered with ice then. The rate of stocking (no. fry/ha) for each pond was as follows: Kallemeyn Pond, 600 in 1981, 3000 in 1982; McMahan Pond (1981), 400; Turtle Lake Pond (1981), 17,000.

**Food of Fingerlings**

What the fingerlings ate in these ponds appeared to be dependent on the availability and size of the food organisms, as well as on the size of the fingerlings. In general, amphipods, cladocerans and chironomid larvae were the most frequently consumed

food items, while organisms such as mayfly larvae, water boatmen, caddisfly larvae, sphaeriids (minute clams), ostracods and water mites were only eaten by larger fingerlings. Some interesting differences in the diet of the fingerlings were observed. For example, the fry of Fathead Minnows were the most frequently consumed food item in the diet of the fingerlings from McMahon Pond. On the other hand, chaoborus larvae were a very important food source only for the fingerlings from Turtle Lake Pond.

The food conditions in the three ponds appeared to be good. At least 65% of the fingerlings examined for diet at any one time contained food in their stomachs; the average figure for each pond was: 85%, 97% and 93% for Kallemeyn, McMahon and Turtle Lake Pond, respectively.



*A comparison of rearing-pond grown and wild stock whitefish fingerlings.*



## Growth and Production

The whitefish fingerlings in the three ponds grew fast up to about the end of August, or 90-120 days after stocking; by this time, the fingerlings could reach an average of around 142 mm in fork length (from nose tip to base of tail) and 42 g in weight. This growth was much better than that of the native whitefish fingerlings in larger lakes.

The survival of the whitefish in Turtle Lake Pond was nearly 100% up to 70 days and 30% up to 152 days after stocking. This gives a population density of 22,267 fingerlings/ha and 6,325 fingerlings/ha, respectively. At an average weight of 40 g, the latter figure is equivalent to a production of 253 kg/ha near the end of the summer.

A total of 13.4 thousand fingerlings were harvested from Turtle Lake Pond from 1-23 October 1981, using gillnets and trapnets. Of these, 6,050 (those caught in traps) were transferred to Turtle Lake. The intensive fishing took 88% of the fingerlings surviving at the time of harvesting.

Survival estimates from the two northern ponds are not available. However, judging from the quantities of fish taken during routine samplings, their survival was probably good. Also, no attempt was made to harvest fingerlings from these two ponds. A small fishing effort did manage to transfer about 500 fingerlings in 1981 and 1,100 in 1982 from Kallemeyn Pond to Big Peter Pond Lake.

## Conclusions

This project has demonstrated that it is feasible to grow whitefish from fry to fingerlings in naturally fertile lakes in central as well as northern Saskatchewan. The survival and growth of fingerlings were good. The production from the small, fertile pond was high. However, the growth pattern suggests that there is no real advantage to keeping the fingerlings in the ponds for more than 90-120 days after stocking. Beyond this period the fingerlings increase very little in length and much less in weight and high mortalities may occur.



*A trap net set to catch whitefish fingerlings in a rearing-pond near Buffalo Narrows.*



# A SIGHTING OF THE WESTERN PAINTED TURTLE FROM MORGAN CREEK, KILLDEER BADLANDS, SASKATCHEWAN

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While exploring the Killdeer Badlands on 30 April 1983 the author, Jim Gibson, and Barb Fosbery observed three Western Painted Turtles (*Chrysemys picta belli*). The turtles were hauled up on a point of land adjacent to Morgan Creek sunning themselves in the late evening sun (6:40 p.m.). The sky was clear and sunny. The air temperature was about 15°C. The turtle most clearly seen appeared quite large — estimated carapace length of 20 cm. The other two seemed noticeably smaller but were not seen clearly enough to estimate size.

The three turtles were observed with 7 x 35 power binoculars for three to four minutes from distances ranging from 100 to 200 m. Upon our closer approach they took to the water. For several minutes their heads could be seen protruding above the water within 50 m of their basking place on shore. Subsequent searches along Morgan Creek in the fading evening light and the next morning failed to produce more turtle sightings.

The pond where the turtles were seen appears to have been formed by flooding due to beaver dams along Morgan Creek. It lies on the southeast side of Morgan Creek directly below the formation known locally as "The Sinking Hill". This location is approximately 20 km southwest of Killdeer and 43 km south-southwest of Fir Mountain.

Secoy says of this species: "this turtle has been reported from the Qu'Appelle

River and Souris River branches of the Assiniboine and the Frenchman River and Battle Creek tributaries of the Milk".<sup>1</sup> She reports Wood Mountain and Killdeer as locations where sightings have occurred in this region. Local rancher Boyd Anderson in conversation with the author stated that turtles are regularly seen basking along Morgan Creek in summer.

This sighting is significant for two reasons. First, it is an early date for turtles to be basking. Second, the sighting is within the boundaries of the east block of the proposed Grasslands National Park.

<sup>1</sup> SECOY, D. M. 1976. The distribution and population status of Saskatchewan's amphibians and reptiles. Saskatchewan Department of the Environment.



Killdeer Badlands area.

Gary W. Seib



# BALD EAGLE MIGRATION THROUGH SOUTHERN SASKATCHEWAN AND MANITOBA AND NORTH DAKOTA

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## Introduction

Bald Eagles breed extensively around the lakes and rivers of northern Saskatchewan and northern and eastern Manitoba.<sup>4-9</sup> In January and February most of these eagles are found in a wide area of the western United States (Figure 1).<sup>3</sup> Few are found in Saskatchewan, Manitoba or North Dakota in those months. This area is therefore a good region to study Bald Eagles to learn more about the routes they take on migration. Some years ago we analyzed our sightings for this region, but did not publish our findings, in part because there was some question about their interpretation. Now, with additional observations, especially near Saskatoon, and with observations of eagles carrying radiotransmitters, we have revised the original material to give an overview of Bald Eagle migration through this region.<sup>2-5</sup> A comparison is made to the migration of Rough-legged Hawks to emphasize certain differences between these species.

## Methods

Much of the information presented here is based on records for the period 1970-73 as reported to C. S. Houston as compiler of the Northern Great Plains region for American Birds. These sightings were supplemented by observations for southern Manitoba by David Hatch from 1958 to the present, near Indian Head (1963-1974) by Mary Skinner, from the region around Saskatoon for 1961 to 1976 as compiled by J. B. Gollop, along the South

Saskatchewan River in fall by Tom Donald, near Winnipeg from 1933-1982 by Angus Shortt, and scattered observations elsewhere reported by a number of individuals. In addition, Jon Gerrard and his wife, Naomi made field trips across North Dakota on 17 and 18 October 1974 and 16-18 and 25-28 November 1975. Some more recent observations by the authors and others are also included where these add significant new information.

## Results

### *Winter distribution of Bald Eagles*

Records for January and February were accepted as representing the winter distribution (Figure 1) in view of the late fall migration of Bald Eagles, and their early return in spring. The number of eagles wintering in the region depends upon the severity of the winter. In a mild winter, at least, occasional widely scattered eagles may be present at sites of open water (e.g. Squaw Rapids, Saskatchewan and Garrison, North Dakota dams) or in upland habitat, particularly in southwestern Saskatchewan.

### *The Spring Migration*

Bald Eagles and Rough-legged Hawks migrate north across the plains of North Dakota, Saskatchewan and Manitoba in March and April (Table 1). The map in Figure 2 shows concentrations of Bald Eagles along the Missouri, James and Souris rivers in



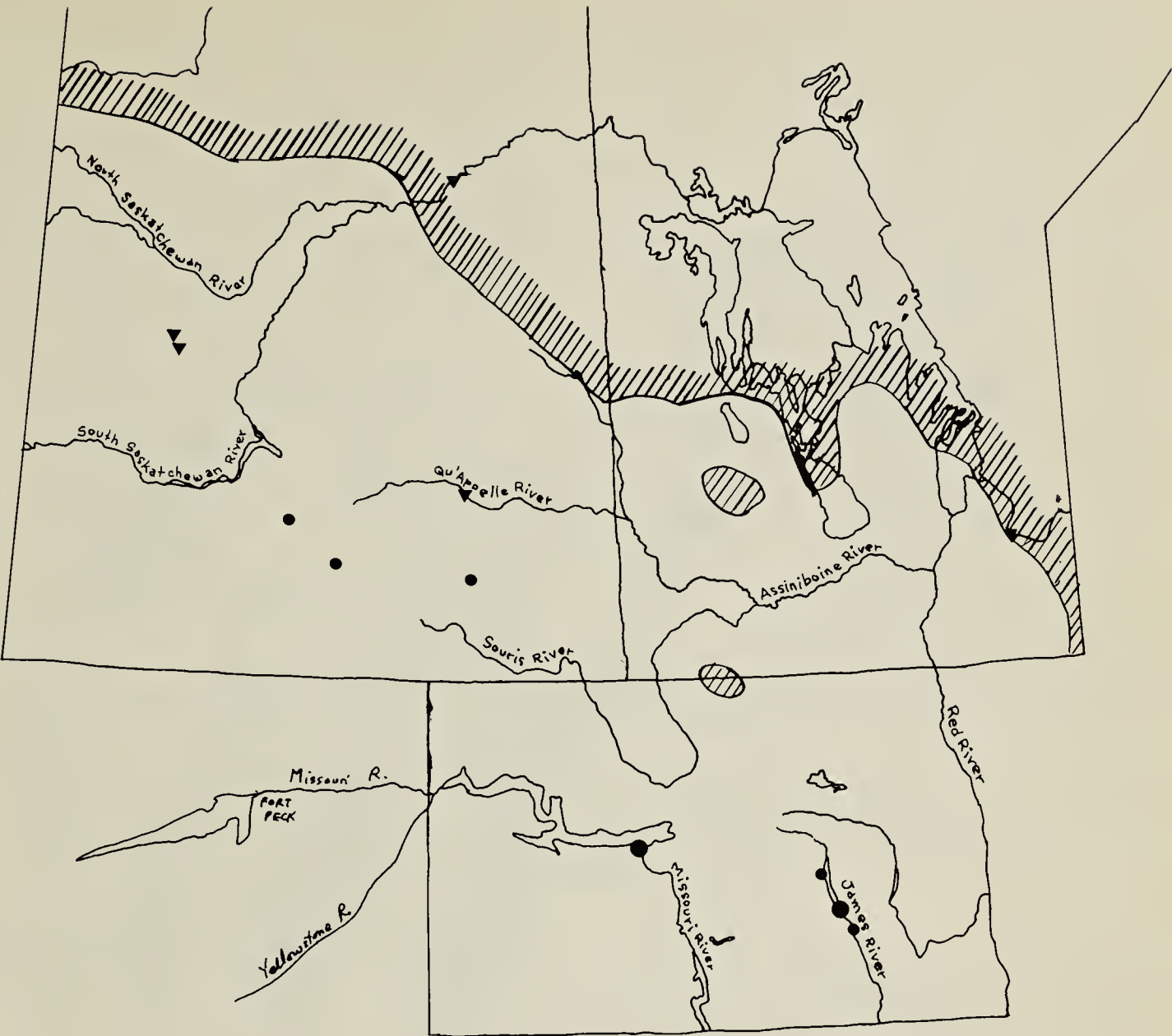


Figure 1: The map shows the approximate current breeding distribution of Bald Eagles (hatched area) plus winter records of Bald Eagles. Winter records for the period 1970-1973 are shown as solid circles. Other winter records are shown as solid triangles. ( ● , ▲ = 1 or 2 eagles ) ( ● = 3-6 eagles ).

Table 1. SPRING MIGRATION DATES OF ROUGH-LEGGED HAWKS AND BALD EAGLES

		Earliest	16% by	Median by	84% by	Latest
A) For the whole region	Rough-legged Hawk	*	Mar. 31	Apr. 9	Apr. 25	May 16
	Bald Eagle	*	Mar. 20	Mar. 31	Apr. 9	May 29
B) By Localities (Bald Eagles only)	North Dakota	*	Mar. 14	Mar. 27	Apr. 7	May 29
	Indian Head, Sask.	*	Mar. 26	Mar. 28	Apr. 8	Apr. 23
	Oak Lake, Man.	Mar. 25	Mar. 28	Mar. 31	May 4	May 4
	Saskatoon, Sask.	Mar. 11	Mar. 30	Apr. 7	Apr. 13	May 6

\*occasional individuals winter



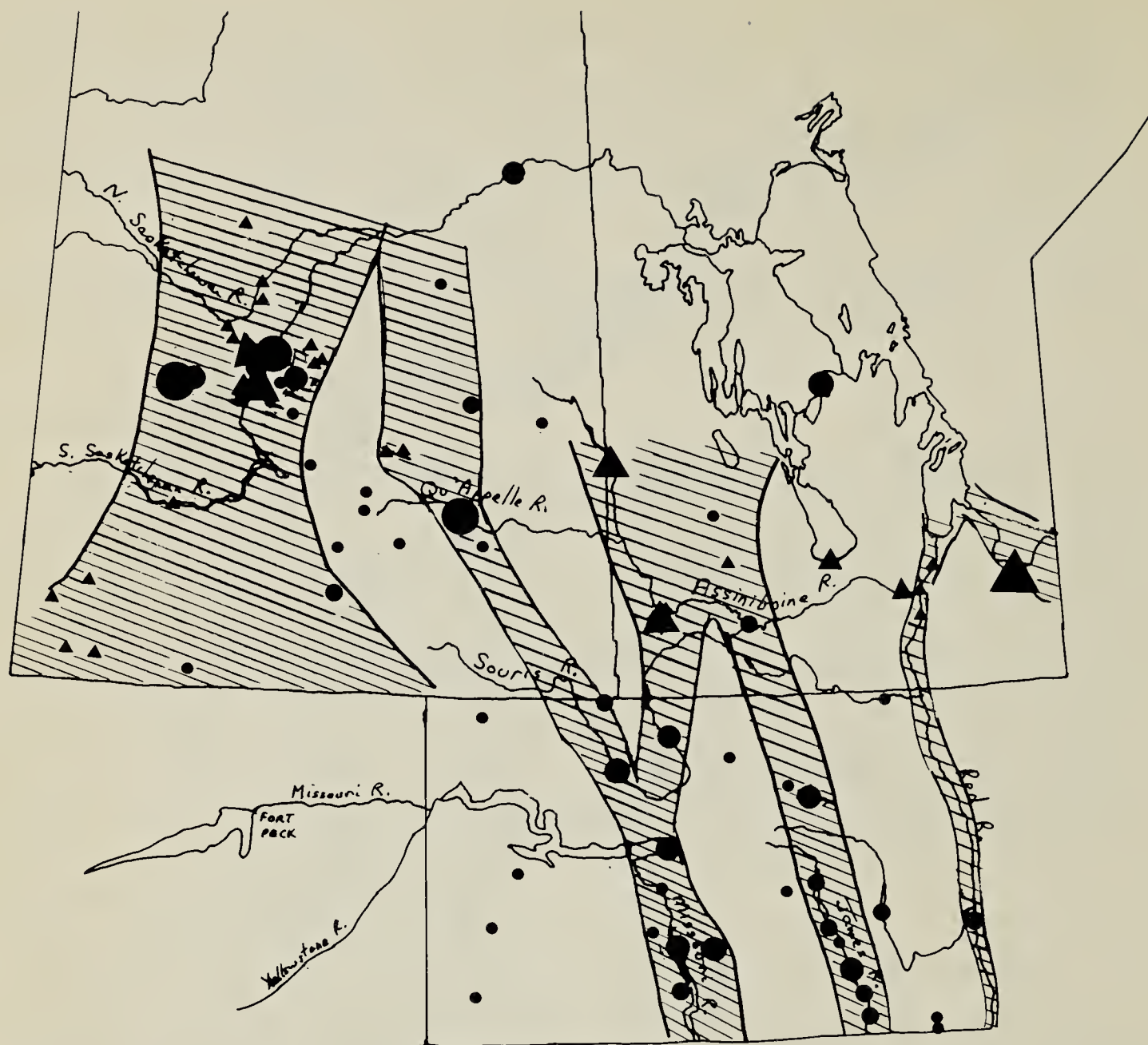


Figure 2: Spring sightings of Bald Eagles for the region. Solid circles refer to records for the period 1970 to 1973. Solid triangles refer to records from other years, which are included only where they add to distribution shown by the solid circles. (●, ▲ = 1 or 2 eagles; ●, ▲ = 3-6 eagles; ●, ▲ = 7-14 eagles, ●, ▲ = 15 or more eagles). Hatched regions show what we suspect are the main migration routes.

Table 2. RELATIONSHIP OF SIGHTINGS OF ROUGH-LEGGED HAWKS AND BALD EAGLES WITH LAKES AND RIVERS

	Species	Percent (Number) Seen		
		Near a lake	Near a river	Away from a river or lake
Spring Migration	Rough-legged Hawk	1.6% (10)	29.4% (187)	69% (439)
	Bald Eagle	12.9% (27)	59.3% (124)	27.7% (58)
Fall Migration	Rough-legged Hawk	22.7% (29)	15.6% (20)	61.7% (79)
	Bald Eagle	32.7% (82)	46.6% (117)	20.7% (52)



North Dakota and along the Qu'Appelle and South Saskatchewan rivers in Saskatchewan. There were few sightings of Bald Eagles away from rivers, except for considerable numbers at Valley Center, and between Rosetown and Biggar, Saskatchewan. At Valley Center, "Almost invariably, the eagles will be found in the afternoon of a warm, sunny day when thermals are developing. Unlike most species, they migrate almost straight north in spring (geese, for example usually migrate through heading almost straight west) and at an elevation of 150 to perhaps 350 feet." (W. Renaud pers. communication). In contrast to the Bald Eagle migration, large numbers of Rough-legged Hawks are seen away from the rivers. Nevertheless, some Rough-legged Hawks do migrate along rivers as attested by the sighting of 90 Rough-legged Hawks on 7 and 8 April 1971, along the Qu'Appelle River Valley north of Indian Head. These birds were flying quite low along the southern valley bank going steadily northwest along the valley using slope lift resulting from an east wind.

We evaluated the difference between sightings of Rough-legged Hawks and Bald Eagles statistically (Table 2) and found the preference of Bald Eagles for rivers during spring migration was highly significant ( $X^2 = 156$ ,  $DF = 4$ ,  $P < 0.001$ ), when compared with the distribution of Rough-legged Hawks. Studies near Saskatoon and of eagles tracked in migration have now shown that the preference of Bald Eagles for rivers is primarily a preference for roost sites along the rivers. Though eagles may migrate to some extent along rivers, much of the time eagles migrate across country away from rivers. The routes across country seem to be chosen with particular regard for irregular terrain. The importance of the Missouri Coteau near Rosetown and Biggar was emphasized when 2 eagles with radio-transmitters followed in 1981 by Al Har-

mata and John Squires (pers. comm.) passed along this route. Further emphasis on the importance of hilly areas or areas with slightly more relief than the surrounding terrain are sightings of eagles migrating near Spring Valley on the Missouri Coteau, migrating over the Thickwood Hills (J. M. Gerrard and Al Harmata 1981), over the Allan Hills, and in the region north of Brandon in Manitoba.<sup>5</sup> Observations by Jon Gerrard in 1981 show that thermal streets can form downwind from hills like the Allan Hills in Saskatchewan. The earlier availability of thermals in hilly areas and the formation of thermal streets downwind of hilly regions are probably a major reason why such terrain is chosen.<sup>7</sup> The presence of fewer observers in such hilly regions, and the possibility that eagles may sometimes fly very high over hilly terrain with good thermals may explain why more eagles are not reported from these regions.

In Figure 2, the broad regions hatched in we suspect represent the main migration routes of Bald Eagles. Many eagles initially move north from North Dakota roosts along the James and Missouri rivers. In Montana, substantial numbers (over two hundred at a time) of eagles may be present along the Yellowstone River in March.<sup>8</sup> These 3 rivers (plus possibly lake and river areas in north central Minnesota and northwestern Ontario) appear to form the major originating areas for eagles moving into Saskatchewan and Manitoba. A very small movement along the Red River does occur, but the numbers are minimal. For instance, in 50 years of hawk watching near Winnipeg principally at Deer Lodge (now Silver Heights) in the 1930s and more recently in St. Vital, Angus Shortt has only 6 sightings of Bald Eagles compared to thousands of Red-tailed Hawks seen in the same period. The very flat topography along the Red River compared to the other rivers is probably the



reason for its low use by eagles. In Manitoba, a large movement occurs through Whiteshell Provincial Park, and a significant movement appears to occur through southwestern Manitoba where the Pembina Hills, the Turtle Mountains, the Carberry Sand Hills and Riding Mountain provide more relief to the terrain. Numbers of eagles can be found roosting along the Assiniboine River between Brandon and the Saskatchewan border. Relatively few eagles come north through central Manitoba in the region between Winnipeg and Portage la Prairie as shown by observations of Gerrard near St. Francois Xavier and observations by John Haugh at Delta.<sup>6</sup> The area is very flat, probably the reason for fewer eagles, however substantial numbers of Rough-legged Hawks sometimes move north through this region as observed by Dr. H. A. Hochbaum, 10 April 1956, when he saw approximately 340 migrating buteos, about two-thirds Rough-legged Hawks and one-third Red-tailed Hawks. Bald Eagles, with a higher wing-loading (Table 3), need stronger thermals for migrating, and such thermals are more consistently generated in terrain with more relief.<sup>7</sup>

In eastern Saskatchewan, significant numbers of eagles pass through the Qu'Appelle River Valley near Indian Head. This location is in line with hills to

the south and north including Moose Mountain, Weed Hills, Pheasant Hills, Beaver Hills and Touchwood Hills; this is probably a reason for this route. In western Saskatchewan, numbers of eagles follow the Missouri Coteau as shown by the sightings near the Bear Hills near Rosetown and Biggar, the Cactus Hills near Spring Valley, and the Thickwood Hills. The South Saskatchewan River is a major roosting location. Regina, on a flat plain, has few sightings of eagles in migration compared to Rough-legged Hawks which are common.<sup>1</sup>

*The Fall Migration*

In autumn, Bald Eagles and Rough-legged Hawks travel southward predominantly during October, November and early December (Table 4). In the Saskatoon area, Bald Eagles usually migrated on days when maximum daily temperatures were  $-5^{\circ}$  to  $+4^{\circ}\text{C}$  (Table 5), and migration was more frequent on days when the maximum daily temperature had fallen from the previous day (Table 6). While the maximum daily temperature for eagle migration in the fall was lower than that in the spring (usually  $0^{\circ}$  to  $+14^{\circ}\text{C}$ ), 41% of the Bald Eagles seen near Saskatoon during the period 1967-1975 were seen on days when there was no snow on the ground.

Table 3. WING LOADING IN BALD EAGLES, ROUGH-LEGGED AND RED-TAILED HAWKS\*

	<i>Weight</i> (grams)	<i>Wing area</i> (cm <sup>2</sup> )	<i>Wing loading</i> (gms/cm <sup>2</sup> )
Bald Eagles (Male)	3,920	5,601	0.70
Bald Eagle (Female)	4,540	6,014	0.75
Red-tailed Hawk (Male)	875	1,878	0.47
Rough-legged Hawk	1,110	2,592	0.43

\* Data on the Red-tailed Hawk and Rough-legged Hawk are from Haugh.<sup>6</sup> Data on the Bald Eagles are from a pair measured at Besnard Lake in 1982.



Table 4. FALL MIGRATION DATES OF ROUGH-LEGGED HAWKS AND BALD EAGLES

		<i>Earliest</i>	<i>16% by</i>	<i>Median by</i>	<i>84% by</i>	<i>Latest</i>
A) For the whole region	Rough-legged Hawks	Aug. 1	Oct. 11	Nov. 2	Dec. 8	*
	Bald Eagles	Aug. 15	Oct. 31	Nov. 10	Nov. 27	*
B) By localities (Bald Eagles only)	North Dakota	Sept. 4	Nov. 2	Nov. 12	Dec. 5	*
	Indian Head, Sask.	Sept. 30	Nov. 8	Nov. 15	Nov. 18	*
	Oak Lake, Man.	Oct. 11	Nov. 6	Nov. 11	Nov. 17	Nov. 20
	Saskatoon, Ssak.	Aug. 15	Oct. 19	Nov. 5	Nov. 14	Dec. 1

\* occasional individuals winter.



Frenchman River valley. Gary W. Seib

Table 5. INFLUENCE OF MAXIMUM DAILY TEMPERATURE ON BALD EAGLE FALL MIGRATION

<i>Maximum daily temperature °C</i>	<i>Number of Bald Eagles seen migrating*</i>
-20 to -16	1
-15 to -11	2
-10 to -6	1
-5 to -1	10
0 to +4	12
+5 to +9	3
+10 to +14	3
+15 to +19	3
+20 to +24	0

\* data from Saskatoon 1967-75



Table 6. FALL MIGRATION IN RELATION TO A CHANGE IN THE MAXIMUM DAILY TEMPERATURE OVER THE PREVIOUS 24 HOURS (SASKATOON 1967-1975)

Change in maximum daily temperature	No. of eagles seen migrating	No. of days
Increase	12	213
Decrease	20	235
No Change	3	38

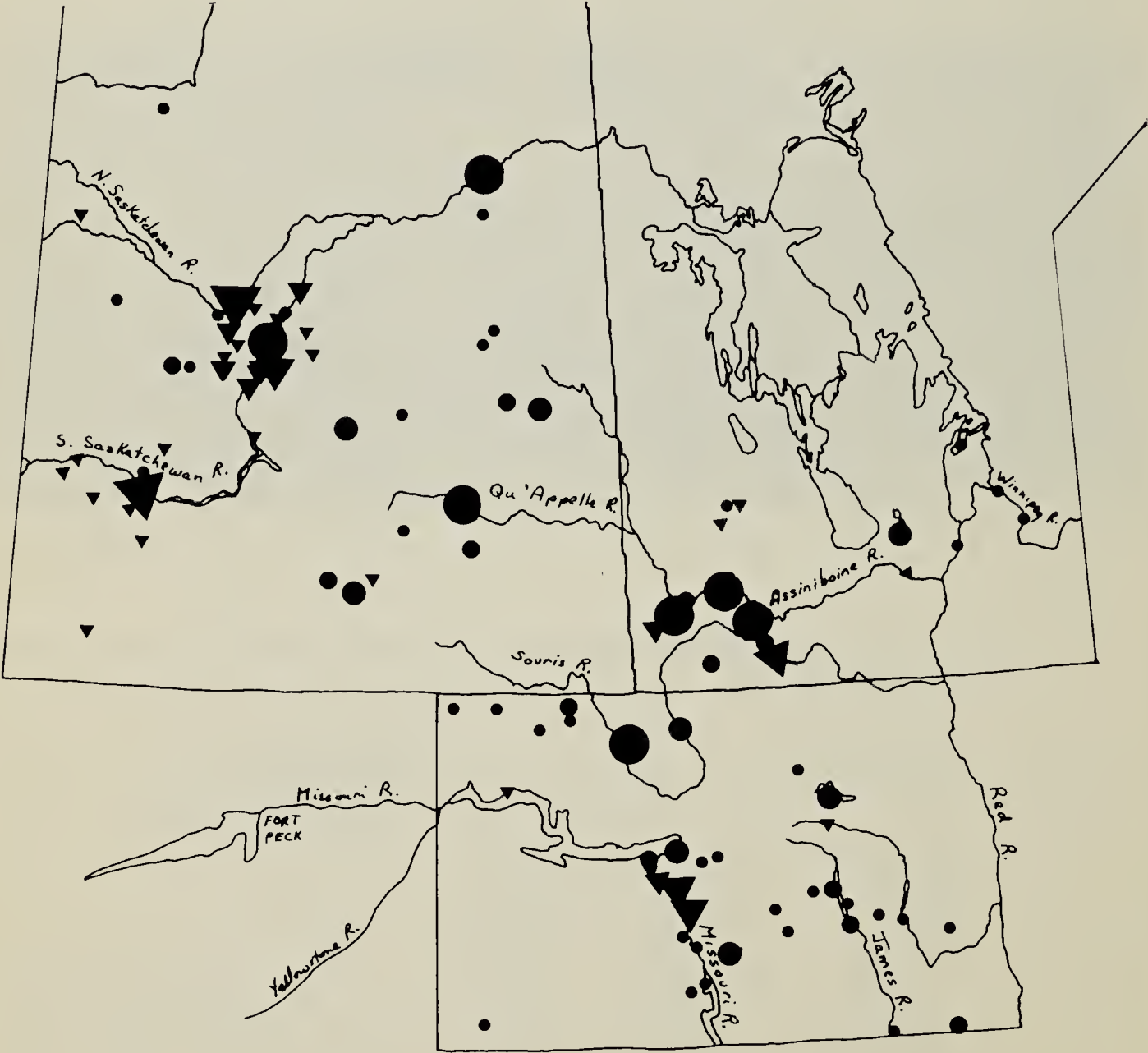


Figure 3: Fall sightings of Bald Eagles for the region. (Symbols are as used in Figure 2.)



Figure 3 shows concentrations of Bald Eagles along the South Saskatchewan, Qu'Appelle, Assiniboine, Souris and Missouri rivers and at Oak, Devil's, Long, Goose and West Shoal lakes. The location of sightings in fall is similar to that in spring, except that lakes are used much more in the fall. A good example of the fall concentration of eagles near a lake is at Oak Lake; it is a large lake just south of the Assiniboine River in western Manitoba, bordered by trees along the south and east sides with considerable wooded expanses of sandhills nearby. The peak of the fall concentration there coincides closely with the dates of freeze up when there are wounded waterfowl present. Some years Golden Eagles, Snowy Owls and Common Ravens are seen in association with the Bald Eagles around the holes in the ice kept open by the waterfowl. In contrast, Whitewater Lake, the only other large lake in southwestern Manitoba is used to a lesser extent by Bald Eagles. Whitewater Lake is farther from the Assiniboine River (the probable eagle migration route), surrounded by a flat plain with few trees for perches, and there is intensive farming up to the marsh edge. All of these differences; but probably particularly the lack of trees, make this lake less suitable for eagles.

Sightings of eagles at Spring Valley (Cactus Hills), just west of Last Mountain Lake and at Sheho are probably consistent with the trend, in spring, for eagles to choose terrain with slightly more relief. This may also explain, to some extent, migration along rivers which have deep valleys. A striking example of eagles migrating along such a river was noted by E. J. Finch whose farm is at the confluence of the Minnedosa and Assiniboine Rivers in Manitoba. On 17 November 1971, a day when there was a strong (about 40 km/hour) wind from the northwest, 39 or more eagles (about 15 adult Bald Eagles, and the rest predominantly immature Bald Eagles) were seen from

1:15 to 4:30 p.m. These eagles came down the Minnedosa River Valley, climbed up to about 600 m in a thermal associated with slope lift at the mouth of the Minnedosa River, and then glided down arriving very low on the south side of the Assiniboine River before catching an updraft where the wind hit the south bank, and climbing again. In contrast to the considerable numbers of eagles at this site, Bald Eagles are rarely seen along the Assiniboine River near St. Francois Xavier west of Winnipeg. One of only 3 migrating eagles seen at this site in 3 fall seasons was followed for 11 km. The bird, an adult Bald Eagle, circled along the river for 8 km and had to flap intermittently where the thermals were not strong enough. It travelled along the river for as long as the river went in a southeast direction and then headed south across open farmland. This region, with few eagles, is very flat compared to the region along the Minnedosa and Assiniboine rivers north of Brandon where deep river valleys create much better soaring possibilities.

Most sightings of Rough-legged Hawks (in contrast to those of Bald Eagles) were made away from lakes and rivers (Table 2). We compared the distribution of Bald Eagles and Rough-legged Hawks with respect to their association with lakes and rivers in fall and found that Bald Eagles were much more likely to be seen near lakes and rivers ( $\chi^2 = 81$ ,  $DF = 4$ ,  $p < 0.001$ ).

In order to further evaluate the relationship of Bald Eagles to lakes and rivers in the fall Gerrard spent 9 days travelling in North Dakota during the Bald Eagle and Rough-legged Hawk migration in 1974 and 1975. The association of Bald Eagles with rivers and lakes was confirmed, as was the association of Rough-legged Hawks with areas away from rivers and lakes (Table 7). The association of these large raptors with their particular habitat included not only time spent perching and hunting, but also time spent migrating.



Table 7. DISTANCE FROM A LAKE OR RIVER OF BALD EAGLES AND ROUGH-LEGGED HAWKS SIGHTED IN NORTH DAKOTA, 1974 AND 1975

	Distance from lake or river					
	: less than 100 yards		more than 100 yards, less than 1 mile		more than 1 mile	
	Perched or Hunting	Migrating	Perched or Hunting	Migrating	Perched or Hunting	Migrating
Rough-legged Hawks	2	0.	6	2	14	8
Bald Eagles	21	14	0	0	0	0

It is our impression that Bald Eagles migrate somewhat lower on fall migration, in general, than during spring migration. The reason may be that eagles tend to migrate on days when temperatures are colder, and frequently when the weather is less ideal for thermals. Many eagles seem to travel at least part of their migration along rivers in the fall. However, it clearly is not possible for eagles to travel from their breeding grounds to their wintering locations solely along rivers, and thus their migration may be characterized to a considerable extent as following rivers where feasible, but deviating from this pattern and taking upland and hilly routes where this is not feasible. Roosting and hunting take place much more in association with lakes in the fall than in the spring as eagles feed on wounded waterfowl, or waterfowl trapped in the ice.

Acknowledgements

We thank the following individuals for providing eagle records or other assistance at some point during the preparation of this manuscript: T. Donald, E. J. Finch, P. N. Gerrard, J. B. Gollop, A. Harmata, C. S. and M. I. Houston, W. E. Renaud, B. Robinson, A. Shortt, M. Skinner, and D. W. A. Whitfield.

<sup>1</sup> BELCHER, M. 1961. Birds of Regina. Spec.

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<sup>6</sup> HAUGH, J. R. 1972. A Study of Hawk migration in North America. Search Agriculture 2:1-60.

<sup>7</sup> STRINGER, E. T. 1972. Foundations of Climatology. W. H. Freeman and Co., San Francisco.

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# NUMBERS AND NEST SITE CHARACTERISTICS OF THE PIPING PLOVER IN CENTRAL ALBERTA, 1974-1977.

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The Piping Plover is classified as a sensitive, threatened or endangered species across most of North America.<sup>1 2 3 5 9 14 15</sup> Recently, surveys and studies have been conducted in an attempt to determine the distribution and size of the remaining populations.<sup>5 7 14 18</sup> The breeding distribution of the Piping Plover is limited to the Great Plains, the Great Lakes and the Atlantic Coast of North America.<sup>4 11</sup> The populations on the Great Lakes and the Atlantic Coast have decreased markedly in recent years.<sup>7 8 12</sup> On the Great Plains, the Piping Plover's status is less well known. Only in Saskatchewan has there been a recent evaluation.<sup>17 18</sup> There, Renaud concluded that some local decreases had occurred, but the population was not showing signs of a general decline.<sup>18</sup>

Aside from a general species account, the status of the Piping Plover has not been investigated in Alberta, where it has been known to breed since at least 1930 but only in the central part of the province.<sup>10 21 22</sup> Between 1974 and 1977, Piping Plovers were censused at selected areas in central Alberta and limited data collected on nest site characteristics from a single "colony". This report documents the results of those investigations and, based on data from other sites, presents a population estimate for the province.

## Methods and Study Area

Each year from 1974-1977 nesting Piping Plovers were censused on a

small beach on the east shore of Dowling Lake (henceforth referred to as East Beach), 16 km north of Hanna, Alberta (Figure 1). In 1975, we measured: a) the width of the beach at the points of nesting along a line perpendicular to the shoreline (this also proved to be the shortest distance from the nest to the water and to the grass mat vegetation), b) the distance between adjacent nests and c) the distance at which incubating plovers flushed from their nests as a result of human intrusions. This latter distance was determined by first locating a suspected plover territory based on the presence of an adult, advancing toward the adult in hopes of flushing a second adult thus indicating the probability of a nest. Retreating to a point where the adult's unhindered return to the nest could be observed, we finally advanced again toward the nest while a second observer watched the incubating bird and noted when it departed. This method was necessary because unless the location of the nest site was known, it was almost impossible to determine when the incubating bird got off its nest.

In June and July 1976 we expanded our census to include the entire shorelines of Dowling Lake, Chain Lakes (NW of Dowling), Third Miquelon Lake and Lowden Lake. These are lakes or lake groups on which Piping Plovers have nested previously.<sup>10 11</sup> They were censused on foot and/or by boat.



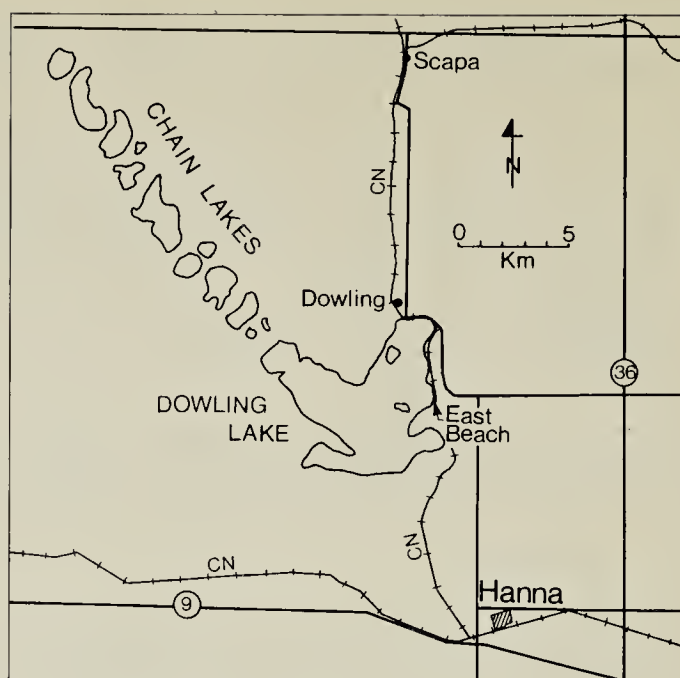
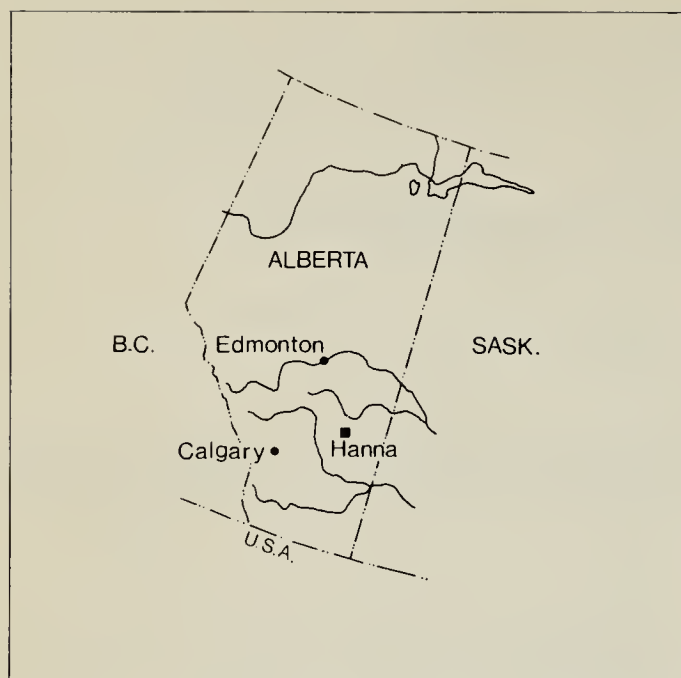


Figure 1. *The Dowling-Chain Lake area north of Hanna, Alberta.*

## Results

The results of our work on East Beach are given in Tables 1 and 2. The length of East Beach was approximately 1000 feet (300 m) and in 1975 the depth of the beach at the points of nesting ranged from 36-43.5 feet (10.9-13.2 m). From 5 to 10 plovers were present on 3-5 territories during the 4 years (Table 1). In 1975 the shortest distance from each nest to the water's edge averaged 28.0 feet (8.5 m) while the average distance from each nest to the continuous grass vegetation (uphill from the nest) was 10.5 feet (3.2 m; Table 2). The average beach depth at the point of nesting was 38.5 feet (11.7 m). Incubating birds left their nests on our second approach at an average flushing distance of 154.0 feet (46.6 m).

The results of the shoreline censuses in 1976 and of other field reports are given in Table 3. There were 12-15 nesting pairs of plovers on Dowling Lake with the greatest concentration on East Beach and on a long pebble beach point on the extreme west shore. The remaining nests were scattered along the shoreline but primarily on the SE and NE shores. No nesting plovers were observed on either of the two main

islands (where gulls nest) in the lake. On 2 of the 6 Chain Lakes, immediately NW of Dowling Lake, a total of 12-15 pairs also were located. The other 4 Chain Lakes were either completely dry or their shorelines were covered by emergent vegetation and were unsuitable nesting areas. On one beach on Buffalo Lake staff from the Provincial Museum observed a single pair and estimated there may have been upwards of 10 pairs of plovers around the very convoluted shoreline of this large lake where they have been reported several times in the past (R. Burns, pers. comm.).

Lastly, from the reports of others, we can trace approximately 22 additional nesting pairs of Piping Plovers in Alberta. Several years ago, Dr. Cy Hampson (formerly Department of Education, University of Alberta) spent 2 summers photographing Piping Plovers at a small unnamed lake near Bashaw. He estimated that there were 10 pairs nesting there each year (pers. comm.). Elsewhere, Kondla and Pinel reported a pair nesting at Goosequill Lake in 1972.<sup>13</sup> A pair also nested at Namaka Lake during the late 1960s or early 1970s (?1973, T. Sadler, pers. comm.).



Table 1. NUMBER OF INDIVIDUALS AND TERRITORIES OF PIPING PLOVERS ON EAST BEACH, DOWLING LAKE, 1974-1977.

<i>Year</i>	<i>Number of Piping Plovers Observed on Territory</i>	<i>Number of Territories</i>
1974	5	3
1975	7	4
1976	8	4
1977	10	5

Table 2. SOME CHARACTERISTICS OF PIPING PLOVER NEST SITES ON EAST BEACH, DOWLING LAKE, 1975 and 1976.

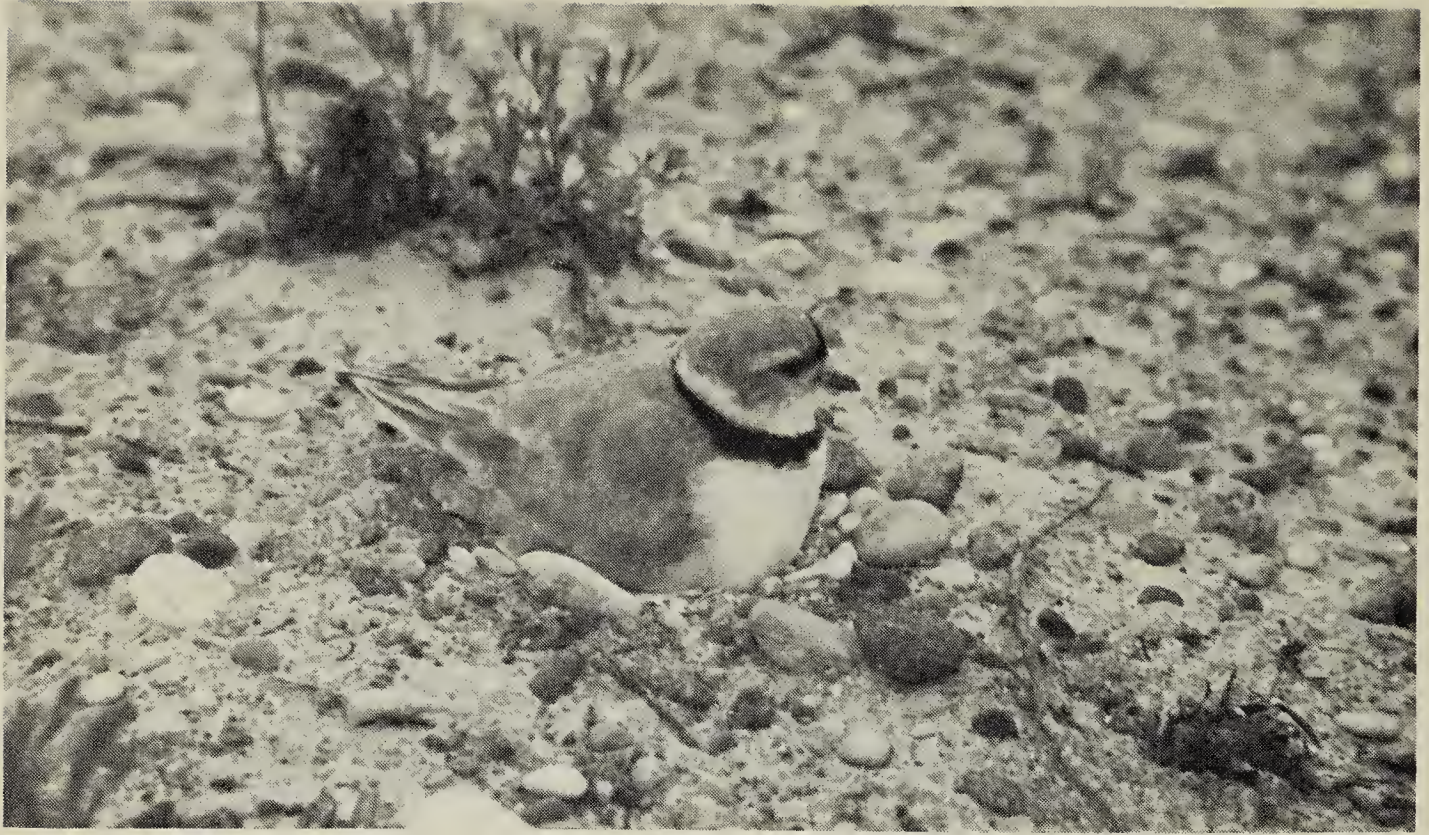
<i>Nest</i>	<i>Nest-water Distance (ft.)</i>	<i>Nest-grass Distance (ft.)</i>	<i>Beach Width (ft.)</i>	<i>Flushing Distance (ft.)</i>	<i>Inter-nest Distance (ft.)</i>
1975					
1	27.0	9.0	36.0	198	
2	25.5	10.5	36.0	126	1 to 2 = 145.5
3	31.5	12.0	43.5	138	2 to 3 = 259.5
1976					
1	Habitat and flushing distances not available.				
2	72.0	16.5	88.5	231	1 to 2 = 282.0

Table 3. NUMBER OF PAIRS OF PIPING PLOVERS RECORDED (OR ESTIMATED) NESTING AT VARIOUS LAKES IN ALBERTA IN RECENT YEARS

<i>Lake</i>	<i>No. Pairs</i>
Dowling Lake	12-15
Chain Lakes	12-15
Buffalo Lake	10 <sup>1</sup>
Unnamed lake near Bashaw	10 <sup>1</sup>
(Third) Miquelon Lake	1-2
Goosequill Lake	1
Namaka Lake	1
Lowden Lake	0
Total	<u>47-54</u>

<sup>1</sup> Estimated





*Piping Plover on nest.*

G. J. Smith

Assuming a fairly constant population of Piping Plovers at each of these locations each year during the period 1970-1977, there were approximately 47-54 known nesting pairs of Piping Plovers at the above 9 lakes.

Based on the known breeding range of Piping Plovers in Alberta (see below), their general habitat requirements and the number and size of the lakes within their breeding range, we would estimate that these figures account for approximately half of the Alberta population, i.e. during the period of this study we estimate there were 100-110 breeding pairs of Piping Plover residing in Alberta.

**Discussion**

*Breeding Range in Alberta*

The above nesting records (save one) all fall within the breeding range of the Piping Plover, as it is shown in *The Birds of Alberta*.<sup>21 22</sup> We know of only 2 Alberta breeding records outside the area bounded on the north by the North Saskatchewan River, the south by the Bow-South Saskatchewan Rivers, the

west by a line from Calgary to Edmonton (No. 2 Highway) and east by Highway 36. The Salts list one record for Gull Lake, to the NW of this area, but as Gull Lake now receives much recreational (boat) traffic, we suspect this site may no longer be active.<sup>21</sup> The record of Kondla and Pinel from Goose Quill Lake is east of Highway 36.<sup>13</sup>

To the north and west of the above breeding range, the major factor limiting nesting would certainly seem to be the natural unavailability of suitable habitat. Much of the area surrounding Beaverhill, Miquelon and Gull Lakes is transitional from Aspen Parkland to Boreal Forest habitat type. In the Boreal Forest area of Alberta, while there are isolated sand and pebble beaches on several of the lakes, the beaches are probably never of the width required by Piping Plovers. The fact that there are few, if any, sight records of Piping Plovers from this area emphasizes the narrow habitat tolerances of the species.<sup>20 21 22</sup>

The most southerly Alberta nesting record of which we know is from



Namaka Lake, approximately 5 miles north of the Bow River. During the summer of 1970 Piping Plovers were seen at Little Fish Lake, NE of Namaka Lake, but they are not known to have nested there.<sup>13</sup> In southern Alberta, south of the Bow-South Saskatchewan Rivers, the lack of breeding records is not easily explained. In this area, approximately south of the Trans-Canada Highway, lie hundreds of square miles of short-grass prairie with multitudes of scattered lakes and potholes — bodies of water which, in many cases, would seem to be ideal nesting habitat for Piping Plovers. However, nesting records are non-existent and there are few sight records for this area of the province.<sup>20</sup> Sight and nest records from northern Montana, adjacent to Alberta, are also scarce.<sup>23</sup> We can offer no precise explanation for this lack of nesting in what would seem like ideal habitat; some special feature must be absent (or present) in this area (see below).

In the eastern third of Alberta, east of a north-south line through Hanna to the

Alberta-Saskatchewan border, a distance of nearly 100 miles (160 km), we know of only one Piping Plover nesting record.<sup>13</sup> This area has a low human population and future searches may reveal more plovers in this area. Renaud shows nest records of Piping Plovers throughout central-southern Saskatchewan up to the Alberta-Saskatchewan border.<sup>17 18</sup>

### *Habitat Requirements*

Several authors have alluded to the necessity of wide, deserted beaches as nesting habitat requirements for the Piping Plover.<sup>6 16 19</sup> Fortunately on many of the lakes in Alberta, where relatively large numbers of plovers nest, there is little, if any, (present) threat of habitat destruction. By current standards these lakes are too isolated from population centres, too alkaline and too shallow for much recreational development. However, a shoreline park and small boat access were developed on Buffalo Lake prior to this study and reportedly displaced a number of pairs of Piping



*Piping Plover nest — Long Point.*

G. Holroyd





*Piping Plover — Manitou Lake, Saskatchewan.*

*Eileen Graham*

Plovers (N. Kondla, C. D. Bird, pers. comm.)!

Concerning beach width, it is unfortunate that we did not measure this feature on beaches (or lakes) that did not support nesting Piping Plovers. On East Beach, the plovers appeared to nest in areas of greatest beach depth. Plovers did nest elsewhere on beaches narrower than those on East Beach but we do not recall finding any on beaches of 5-10 feet (1.5-3 m) width.

The width of the beach, and hence the area available for territory selection, is dependent upon the water level of the lake. This was illustrated dramatically in 1977, a very dry year, when the average width of East Beach increased to 183 feet (55.5 m). This drought quadrupled the available beach and, along with the complete drought of the two Chain Lakes, which held plovers in 1976, may explain the appearance of a fifth pair of plovers on East Beach in 1977.

#### *Stability of Population*

With an estimated provincial breeding population of 100-110 pairs, the stability of the Piping Plover nesting population is very important. From admittedly sketchy, general and word-of-mouth accounts some indication of population

stability can be gathered. Salt and Wilk list Miquelon, Buffalo, Gull, Baxter and Beaverhill Lakes as (historical) nesting areas.<sup>22</sup> Piping Plovers continue to nest at Miquelon and Buffalo Lakes. They do not nest at Beaverhill Lake, though they are occasionally seen there, and we know of no recent records from Gull or Baxter Lakes. The nesting at Namaka Lake seems, at best, to have been irregular. In 1970-72 and 1974-75 visits were made to the very isthmus on which the nest was found, but to no avail. As stated above, Dr. Hampson reported consistent numbers in each of 2 successive years near Bashaw. In July 1970, while the senior author was banding gulls on Dowling Lake, Bill Glasgow showed him his first nesting pairs of Piping Plovers. Glasgow estimated there to be perhaps a dozen pairs nesting around the lake at that time (pers. comm.). The reports of Glasgow and our surveys at Dowling Lake suggest that the population there has been stable at  $12 \pm$  pairs for the previous six to seven years.

Thus the picture that emerges is that at what may be the centre of their Alberta range, Piping Plover numbers appear stable. At the edges of their Alberta range, the presence of nesting pairs is not as consistent as at more



centrally located areas and the numbers of nesting pairs per lake is substantially reduced. Local drought conditions may greatly affect the presence and numbers of nesting pairs but presumably this is only a short term and/or cyclic effect.

## Acknowledgements

Portions of this study were conducted while the senior author was employed by the Provincial Museum of Alberta (PMA). We would like to acknowledge the field assistance of Karen Drysdale (PMA volunteer) and Ludo Bogaert, Jasper Kaiser and Rod Burn (past or present PMA employees). Dr. Cy Hampson kindly provided unpublished data. W. E. Renaud and M. K. McNicholl made comments on earlier versions of this text.

- <sup>1</sup> ARBIB, R. 1972. The blue list for 1973. *Am. Birds* 26:932-933.
- <sup>2</sup> ARBIB, R. 1974. The blue list for 1975. *Am. Birds* 29:1067-1077.
- <sup>3</sup> TATE, J. Jr. 1981. The blue list for 1981. *Am. Birds*. 35:3-10.
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- <sup>11</sup> GODFREY, W. E. 1966. The birds of Canada. Nat. Mus. Can. Bull. No. 203, Biol. Ser. No. 73, Queen's Printer, Ottawa. 428 pp.
- <sup>12</sup> HUSSELL, D. J. T. and R. D. MONTGOMERIE. 1966. The status of the Piping Plover at Long Point, 1960-1965. *Ont. Field Biol.* 20:14-14.
- <sup>13</sup> KONDLA, N. G. and H. W. PROVEL. 1973. Breeding records of 19 species of birds in southern Alberta. *Blue Jay* 31:153-157.
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- <sup>24</sup> WILCOX, L. 1959. A twenty-year banding study of the Piping Plover. *Auk* 76:129-152.



# EDWARD ARNOLD AND WALTER RAINE AT THE SHOAL LAKES, MANITOBA — 1894

MARTIN K. McNICHOLL, 320 Markham Street, Toronto, Ontario. M5G 2K9

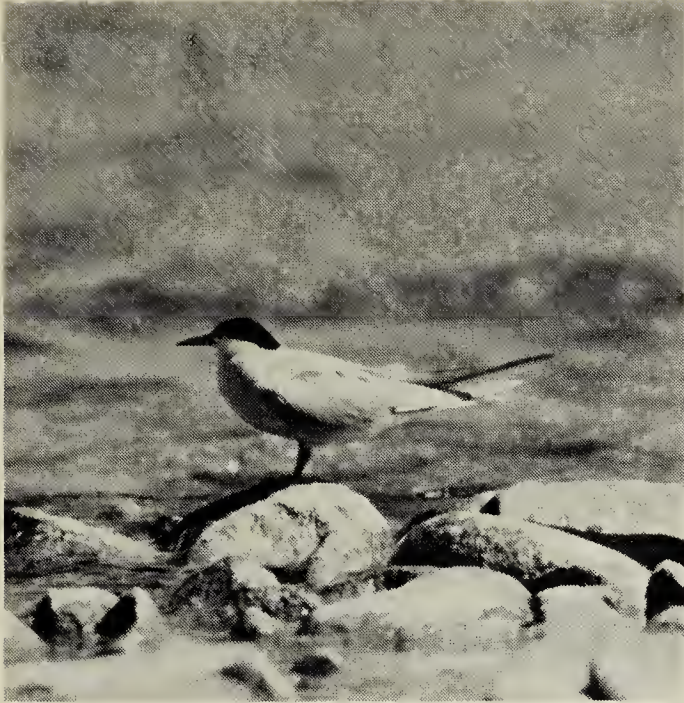
Houston and Bechard recently provided a highly informative account of the contributions of oologist Edward Arnold to the ornithology of the Canadian prairie provinces.<sup>7</sup> In this account, they mentioned a trip that Arnold made with Walter Raine (the subject of another paper by Houston) to Shoal Lake, northwest of Winnipeg.<sup>6, 7</sup> In his earlier account of Raine's contributions, Houston mentioned a trip by Raine to Raeburn, Manitoba in 1893, but did not mention the trip of the following year to Shoal Lake.<sup>6</sup> Much earlier, Taverner stated that Arnold and Raine visited Shoal Lake in 1893 *and* 1894.<sup>13</sup> In fact, Raine made two trips to Shoal Lake, both in June 1894, the first with Arnold and two companions, the second with an unnamed local farmer.<sup>1, 11</sup> Houston and Bechard were correct in stating that these trips occurred in 1894, as Arnold states that he and Raine planned the trip in winter 1893 and that it took place in 1894.<sup>1</sup>

Raine mentioned the first trip only briefly, apparently relying on Arnold to supply the details.<sup>11</sup> According to Arnold, they travelled from Raeburn to the lake on 8 June in "rather warm" weather, stopping en route to look at some nests of Cliff Swallows on an old house and to look for a nest of a Blue-winged Teal by a ditch.<sup>1</sup> They arrived at Shoal Lake about 1800 and were soon in a colony of terns with "hundreds" of nests. They identified the terns as Forster's, but Taverner questioned this identification on the grounds that neither mentioned Common Terns, a species which is more abundant there.<sup>2, 13</sup> Cer-

tainly the gravel nest sites of this colony are more suggestive of Common, although Forster's occasionally nest on such sites.<sup>10</sup> An earlier account by Donald Gunn of finding terns nesting both on gravel and on floating mats of vegetation suggests that both species may have been present.<sup>4</sup> Arnold also mentions finding nests of Canvasback, Redhead, and Greater Prairie-Chicken that first day.<sup>1</sup> Modern naturalists may raise eyebrows at the latter, but this species was common on the prairies during this period, and Taverner found them still more common than the Sharp-tailed Grouse in 1917.<sup>8, 13</sup> Mosquitoes were a major irritant to Arnold, but the heat proved more of a problem as he was driven to sample the alkaline water of the lake, the effects of which he felt long after their visit.<sup>1</sup> Arnold also reports that on 9 June he and Raine found nests of three species of grebes, American Bitterns and Wilson's Phalarope.<sup>1</sup> Although Raine mentioned their stay was 5 days, Arnold's account covers only two.<sup>1, 11</sup>

Raine had hoped to visit a colony of American White Pelicans visited by R. Hunter in 1878, but he and Arnold did not find it on their joint visit.<sup>11</sup> Raine decided to try again and returned to the lake with a local resident on 17 June, when they found that a 12 June storm had washed out much of the tern colony that he and Arnold had visited earlier.<sup>11</sup> He found a few young terns there as well as a Spotted Sandpiper nest. Raine and his companion found several duck nests, another Wilson's Phalarope nest, and several





*Common Tern.*

Larry A. Morgotch

grebe nests before proceeding to another peninsula of the lake. While they took shelter from a storm, a settler told them the location of the pelican colony. That evening they rowed to a colony island, where they collected eggs of the pelicans, Double-crested Cormorants and Herring Gulls. They then moved on to another island where they found more pelicans, more duck nests, more Herring Gulls and another colony of "Forster's" Terns. As darkness overtook them, the weather grew stormy again, and they spent the night under their boat. Raine's dedication to his hobby is indicated by his rising at 0400 the next morning to spend 3 hours blowing eggs before awakening his companion to complete their return trip.<sup>11</sup>

The "Shoal Lake" of Gunn, Arnold, Raine, Chapman and Taverner northwest of Winnipeg varies markedly in water levels and is at times divided into three lakes: East Shoal Lake, West Shoal Lake, and North Shoal Lake.<sup>9</sup> These marked changes in water levels affect the breeding of birds in the area, most notably that of the American White Pelican.<sup>3 5 9 13</sup>

Houston and Bechard wisely caution the reader not to confuse the "Shoal

Lake" visited by Arnold with the town of the same name west of Minnedosa.<sup>7</sup> To this caution, I would add that there is yet another Shoal Lake in Manitoba near Lake-of-the-Woods from which Winnipeg gets its water supply and which is also a subject of the ornithological literature.<sup>12</sup>

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<sup>6</sup> HOUSTON, C. S. 1981. An assessment of Walter Raine and his Saskatchewan records. *Blue Jay* 39:168-181.

<sup>7</sup> HOUSTON, C. S., and M. J. BECHARD. 1982. Edward Arnold, enthusiastic oologist. *Blue Jay* 40:184-192.

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# RED-HEADED WOODPECKER

JEAN BANCROFT, 306-200 Tuxedo Avenue, Winnipeg, Manitoba. R3P 0R3

During the summer of 1982 two pairs of Red-headed Woodpeckers nested in the immediate area of our cottage at Whytewold on Lake Winnipeg. On 25 May I heard repeated calls of churr-churr and then noticed two of these birds flying back and forth across the busy road which runs in front of our cottage. They appeared to be chiselling wood-boring insects from tree trunks.

As this procedure continued for many days, I determined to locate the nest site. I had previously noted a broken-off poplar on a wooded lot in front of a cottage approximately 150 m. down the road. There were at least seven holes in the partly dead tree.<sup>1</sup> After returning several times, on 13 June my efforts were rewarded. As I stood with my binoculars focused on the cavities an adult bird flew into one of them, freshly excavated, approximately 2.4 m. from the ground. I presumed at that time that incubation was taking place. Since the sexes are similar, I was not able to determine if both male and female took part in incubating the clutch, but Bent says that "both sexes assist in this duty, as well as in the care of the young . . . incubation is said to last for about 14 days."<sup>2</sup>

I visited the site on several more occasions, but it was not until 5 July that I saw an adult enter the hole with a beakful of fishflies. On 18 July I saw two nearly-fledged young close to the cavity entrance, and the next day I watched an adult feed fishflies to one of them.

After I had been observing this nest for several days I became aware of the fact that there must be another pair of Red-headed Woodpeckers in the area; every once in awhile I noticed an adult fly criss-cross through the wooded lot at

the south side of our property. It appeared to be heading, I thought, for a particular secluded spot not too far away. On 26 June about 60 m. across a narrow roadway from the first-discovered nest site, I noticed two adult birds drilling for grubs on top of a telephone pole and then flying into a private wooded area. I discovered that they were taking food to a cavity, approximately 3 m. from the ground, in a partly dead broken-off poplar. An adult flew across the roadway 29 June returning to the nest cavity with a beakful of insects. The other adult sat atop the telephone pole, preening its feathers, sunning, and then drilling for grubs.

I presumed, at that time, that the nestlings were quite young because every time an adult brought food to the cavity its entire body disappeared into the hole. Literature cites a depth of 20.3 cm to 61 cm for a nest cavity.<sup>3</sup> By 5 and 6 July an adult bringing insects poked only its beak into the hole; 2 days later I noticed one young head protruding. Two fledged young were seen climbing up the dead tree above the nest hole 17 July.

On this occasion I was very surprised to notice one of the adults was commencing to drill a new hole in the same tree 0.6 m. higher up. As work on this second cavity began before the first nesting had been completed, could it be that the birds intended to have a second family? As the bird drilled, it was fascinating to watch the sawdust flying. I have read that Nature has provided woodpeckers' noses with a lining of tiny hairs to keep them from breathing the sawdust as they drill.

On 19 July I observed one fledgling on the same tree and an adult was still



working on the new hole; its whole body now disappeared into it. It was amazing to see how smooth and round was the 5 cm doorway.

In neither of the nests was I able to determine the size of the clutch nor the exact number of young. Literature cites a clutch of 4 to 7 and that "as an egg is laid each day and, as incubation often begins before the set is complete, the young may hatch on different days."<sup>2</sup>

I was surprised 21 July to notice a fledged young trying to get out of the new hole which the adult bird(s) had made. It kept giving calls, slid back in, and then pulled itself half way out; it almost appeared to be stuck!

After the young had fledged, on numerous occasions until the first week in September, I heard the churr-churr calls from the birds of these two families, and saw adults and brown-headed fledglings flying in and out of the treed areas nearby. They also made a practice of flying back and forth across the road. It is a well-known fact that this species suffers great losses because of this habit.

Red-headed Woodpeckers appear to be increasing all along the beach area on Lake Winnipeg. During the summer of 1982, eight were seen at one time on the golf course at Winnipeg Beach. While they are a fascinating bird they can, however, cause problems. A permanent resident, who lives approximately 8 km north of Winnipeg Beach, became quite disillusioned with a pair of these birds in June. They took over the feeder completely; in fact, they took over the entire yard. Northern Orioles, in particular, were attacked continuously and thus were prevented from building nests. (In 1981 three pairs of these birds had nested.) Finally, the resident ceased to put any more sunflower seeds on the feeder and the Red-headed Woodpeckers flew off to an adjoining wooded property.

Red-headed Woodpeckers are fascinating birds. The brilliant red head and the large white wing patch stand out in flight, thus attracting a great deal of attention. There can be no greater pleasure than to observe this very interesting species.

<sup>1</sup> BANCROFT, JEAN. 1982. Trees for Cavity-Dwellers. *Blue Jay* 40 (3):166-167.

<sup>2</sup> BENT, ARTHUR C. 1964. Life Histories of North American Woodpeckers. New York, Dover Press.

<sup>3</sup> HARRISON, HAL. H. 1975. A Field Guide to Birds' Nests in the United States east of the Mississippi River. Boston, Houghton Mifflin.

## INFORMATION WANTED — BIRDS OF THE SWIFT CURRENT AREA

I am seeking sight records for birds of the Swift Current area. Information concerning numbers, early and late dates and nesting records, with the location and observer's name are of interest.

The study area for my proposed bird list consists of a 50 km circle centered on Swift Current. This includes Saskatchewan Landing Provincial Park on the north, Reed Lake at Morse to the east, and extends west almost as far as Gull Lake and south 15 km beyond Cadillac.

All such records should be sent to: *Christopher Harris*, c/o Prairie Wildlife Interpretation Centre, Box 10, Webb, Saskatchewan. S0N 2X0



# (UN)USUAL NESTING SITE OF THE EASTERN PHOEBE

VICTOR C. FRIESEN, P.O. Box 65, Rosthern, Saskatchewan. S0K 3R0

The equivocal nature of the title of this piece (caused by the parentheses there) merely points to the fact that what may seem unusual to us is hardly so to the Eastern Phoebe.

Originally these phoebes nested on ravine ledges or in nearby cavities but now make extensive use of man's structures, particularly those that provide overhead shelter. Thus bridges, rafters, and eaves are favorite nesting sites. The nest is attached to some projecting surface.

At a neighboring farm home, 4 km east of Rosthern, phoebes have found the ideal nesting requirements on the socket of the porch light above the front door, as shown in the accompanying illustration. The site has been so attractive that these birds have nested there continuously for the past 3 years, successfully raising 2 broods each year. According to Chapman and Forbush and May phoebes will often change quarters for the second brood because of bird lice and other parasites accumulating in the first nest, but such



*Eastern Phoebe nesting at Rosthern.*

*V. C. Friesen*



relocation has not been the case here.<sup>2 3</sup>

On the whole, phoebes are extremely adaptable to man and his works. Forbush and May cite several instances of their nesting in strange situations, such as in an old colander hung on a barn wall, or in a well where a knothole in the lid was used as an entrance.<sup>3</sup> And Bent records one previous instance of their nesting around a lamp socket, although there the nest was partly supported by a wire.<sup>1</sup> Both studies refer to the birds becoming accustomed to the daily occurrence of people passing by.

This nest site, besides having ample overhanging eaves, has one additional feature which recommends it. It is near water, for a slough with a built-in dugout is but a few hundred metres from the house. The water provides a good hatch of insects, and flying insects are a phoebe's chief food. The light bulb's be-

ing turned on occasionally during twilight even attracts food close to the nest. The slough also provides mud for nest building and repair, and water for bathing. The Eastern Phoebe is "a great bather."<sup>3</sup>

The distractions, then, of slamming doors and flicking lights have not deterred this friendly little bird from being, as Chapman says, "a devoted parent . . . rarely found far from home."<sup>2</sup>

<sup>1</sup> BENT, A. C. 1963 (reprint of 1942). Life histories of North American flycatchers, larks, swallows, and their allies. New York, Dover. 555 pp.

<sup>2</sup> CHAPMAN, F. M. 1937. Handbook of birds of eastern North America. New York, D. Appleton-Century. 581 pp.

<sup>3</sup> FORBUSH, E. H., and J. R. MAY. 1939. Natural history of the birds of eastern and central North America. Boston, Houghton Mifflin. 554 pp.

# CARDINAL AT SYLVAN LAKE, ALBERTA

W. B. PARSONS, MD, Box 418, Sylvan Lake, Alberta. T0M 1Z0

On 26 June at 1530 hours my wife and I were having tea when she said, "There's a bird I don't recognize. It looks as if it has a black eye."

I moved to the window, then gasped. I had seen this bird down east. The dark area at the base of the bill extending up to the eye from the heavy reddish bill plus the crest are characteristic of the Cardinal, this one a female, the red muted, the body a soft sort of golden brown. She was 3 m from us, pecking at some hay mulch on a rose bed. She was there long enough for us to study her with field glasses and to see the faint red in the crest, wings and tail; and to see our sighting duplicated in five bird books: Gilbert Pearson, Godfrey, Peter-

son, Audubon and Robbins et al. None of them mentions a sighting closer than southeast Saskatchewan though a friend of mine saw a male on the north side of this lake in 1981 but didn't report it.

For more than a quarter century we have tried, with considerable success, to attract birds to our 85 lakeshore acres of cropland, pasture and woodlot. It seems that when passing birds see the large number here they decide that it's a safe place to stop, so the number and variety grow. Unhappily, I didn't get a picture of the cardinal so this sighting will classify as hypothetical, but I am convinced of its authenticity.



# DOWNY WOODPECKER SHOWS INVESTIGATIVE BEHAVIOUR TO ARTIFICIAL MOUSE

ROBERT W. NERO, Manitoba Wildlife Branch, Box 14, 1495 St. James St., Winnipeg, Manitoba. R3H 0W9

At noon on 23 January 1983, Herb Copland and I were trying to capture a Great Gray Owl we had found just off PTH 12, on the road to Menisino, in extreme southeastern Manitoba. It was a perfect day for looking for owls to band — heavily overcast, calm and mild.

Herb was on his knees on the edge of the road in readiness to net the owl if it came in to the artificial mouse that has proved to be so effective in bringing in owls close enough to catch. I was standing beside Herb, casting the lure across the road and reeling it in; the owl was some distance back from the road in a stand of aspen.

The "mouse" consists of a flat piece of wood approximately 4½ inches long and 2 inches wide, covered with artificial fur (from a fur hat), and has a piece of shoestring for a tail. Reeled in across the snow it somewhat resembles an oversized mouse. Responsive (and presumably hungry) Great Gray Owls have come from as far as 200 yards to pursue the lure close enough to be netted.

I had cast and retrieved the lure several times, with no response from the watching owl, when suddenly a female Downy Woodpecker flew in from behind us and swooped low over the moving lure, coming down within two feet of it, then continuing on across the road to perch on the trunk of an aspen tree where it proceeded to inch upwards in typical woodpecker fashion. The woodpecker had flown within a few feet of us; when it dipped down and swooped at the lure it was still no more



*Downy Woodpecker.*

*Gary W. Seib*

than six or eight feet away.

On the next cast across the road, shortly after I started to reel in the lure, the woodpecker again flew straight towards the lure, dropping down at it as if trying to harass it or get a better look. The woodpecker followed the lure briefly and then, as the lure was brought in and lifted up, flew away behind us.

Over many years and in many hundreds of casts made with this lure we have not witnessed any bird other than an owl (including Great Gray Owl, Barred Owl, Great Horned Owl, Snowy Owl, and Hawk Owl) show any interest in the lure. We were both astonished and mystified by the woodpecker's reaction to the lure. It was completely unexpected and we have no explanation to offer for this slight but peculiar observation.



BIRD NOTES FROM  
SPRING VALLEY

FLOSSIE BOGDAN, Box 92, Spring Valley, Saskatchewan. S0H 3X0

I would like to share the following bird observations made during 1982.

On Sunday 5 September 1982 at 10:00 a.m. it was a beautiful sunny morning. I was out for a walk when a white bird appeared overhead; my first thought was "that's an odd looking gull". Then, as it sort of hovered and tilted its wings (as though to let me have a better look) I noticed its facial markings, the falcon-like bill and the long tail — also I thought the head was a bit oversize; the flight was falcon-like — smooth gliding. It appeared to be hunting.

I kept my binoculars focused on it until it got out of sight behind the trees, to where our partridges are usually found. Then I hurried back to the house to check with the books. There was no doubt about it — it was a white Gyrfalcon. Since it was too early for migration it must have been one that escaped from captivity. Whose Gyrfalcon was it?

\* \* \* \* \*

We recorded our first Piping Plover

nest in June 1982. The nest was first located 20 June — it contained 4 eggs. On 5 July we were asked to show a Vancouver birder (a lady) around and, of course, we were delighted to have this special nest to show her (Piping Plovers were new to her) but the nest only had two eggs. As we stood there wondering what happened to the other eggs the adult plovers were piping loudly, almost at our feet. Then a newly hatched wee chick was noticed a foot or so away from the nest, blending so well with the sand and pebbles we decided not to look around any further. Carefully we stepped away.

\* \* \* \* \*

On 19 September 1982 among a flock of Red-winged Blackbirds, roosting in bullrushes, was a strange looking bird. Upon closer examination we found it to be a Red-winged Blackbird with a white throat and neck, with the white extending down the front of the neck. Is this a common thing? We haven't seen one like it before, but then, we don't always take time to examine the blackbirds too closely. This flock was roosting just a stone's throw away from the hen house when I went to gather the eggs. I usually carry my binoculars with me and when I don't, I end up being sorry for not doing so.



*Red-winged Blackbird.*

*Fred Lahrman*



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# JUNIOR NATURALISTS

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## BIRD-WATCHING IN REGINA

This month, we have a letter from one of our young readers from Regina. I hope it will familiarize a lot of readers with the bird-watching opportunities of our city.

### **Wascana Waterfowl Park**

The Wascana Waterfowl Park is one of Regina's best birding spots. It is located east of Broad Street and runs to the city limits along the Wascana Lake and Creek water system. Throughout the year many different species of birds can be seen in their natural habitats and at close range.

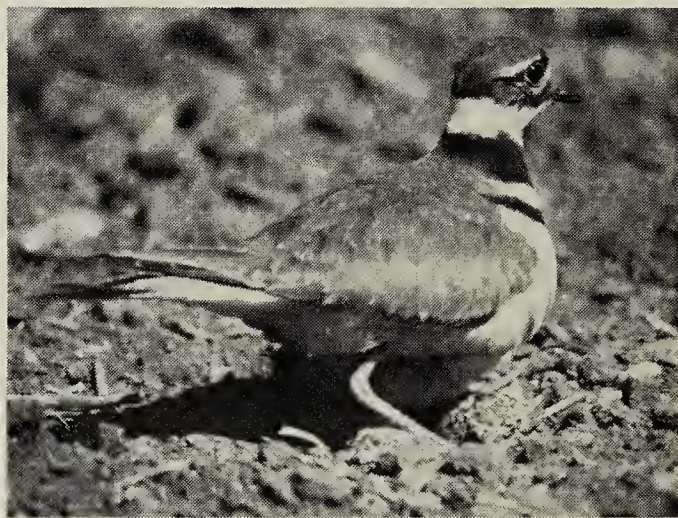
Waterfowl such as the large Canada Goose to the smaller Mallard, Lesser Scaup, Redhead and American Wigeon can be seen throughout the park, but they aren't the only birds in the park. The ever common Rock Dove (pigeon), House Sparrow, and Black-billed Magpie live in the park all year round, while the Common Crow likes to get out of the cold and migrates to the warmth of the south during the long, cold winter.

The enthused bird watcher who likes "a little more action" can walk over to a group of small willows to observe a Myrtle and Yellow Warbler, and Song Sparrow. Is that a Common Yellowthroat at the back?

You notice a group of sturdy elms further on and continue your pleasant journey. You're almost there when you hear a sonorous tapping and eight metres up a half-dead elm is the black-"moustached" Common Flicker searching for minute insects which bore

under the coarse bark. You watch this magnificent bird and continue your trek when oddly you catch a glimpse of a smaller relative of the flicker, the petite Downy Woodpecker.

If you walk about another hundred metres you are in the midst of a vast marsh. Roosting on the numerous cattails are the abundant Red-winged and Yellow-headed Blackbirds summoning their mates. Aren't those the familiar Killdeer and Lesser Yellowlegs on the opposite shore?



*Killdeer.*

*Lorne Scott*

The songs of the birds and the peacefulness of the tranquil water urges you to continue but you must head back. But wait — what was that; you listen intently, you hear a dim but near ker-whee. You listen again. In front of you shoots up the very shy Sora, a rare sight! You stand stunned; you shake your head to clear it, let the ol' heart regain its once unified rhythm and stand in amazement.



Turning back is the hard part but still there are ample chances ahead to see many more species of birds which live throughout the park. Ahead you hear the nattering of terns. Flying overhead is a group of about ten Common Terns. They are in search of small fish which lurk in the water below. Following the terns are a pair of Tree Swallows which will have no part of the tern's feeding frenzy.

Farther on you see some American Coots awkwardly lifting off the rippleless water. Just behind the coots is a small group of Ring-billed Gulls resting in the warmth of the sun.

You can see your car now and turn for a last look at this natural habitat park — well, until tomorrow!

If this is just a little more than you bargained for you can always go for a leisurely walk around the display ponds or just sit on one of the benches and enjoy the view. The display ponds, lo-

cated on Lakeshore Drive across from the Centre of the Arts, are open to the public from 9 a.m. to 9 p.m. A display panel at the ponds assists visitors in identifying and studying waterfowl such as Snow and White-fronted Geese, Whistling swans, Pintails and many more. But please remember the birds of Wascana Waterfowl Park are wild. Please respect this, because it's their park too!

BELCHER, M. 1980. Birds of Regina. Sask. Nat. History Soc. Spec. Publ. No. 12. 151 pages.

ROBBINS, C. et al. 1966. Birds of North America. Golden Press. New York, N.Y. 340 pages.

— *Paul Chytyk*, 115 Rink Ave., Regina, Saskatchewan (grade 9).

Do you have a favorite nature spot? Why don't you write us about it and what you see there? — *Paule B. Hjertaas*, 919 Cook Crescent, Regina, Saskatchewan. S4X 2L9



*American Coot.*

*Fred Lahrman*



## ATLAS OF THE RARE VASCULAR PLANTS OF ONTARIO (ATLAS DES PLANTES VASCULAIRES RARES DE L'ONTARIO)

GEORGE W. ARGUS and DAVID J. WHITE (Editors). 1982. National Museums of Canada. National Museum of Natural Sciences, Botany Division, Ottawa, Ontario K1A 0M8. 95 Species Pages published to date. (Apparently available free on request).

Naturalists and biologists are becoming increasingly concerned about the loss of threatened species and their often unique habitats. Such depletions represent irretrievable losses of gene resources and impoverishment of our natural heritage. Concern about rare and endangered species began with mammals and birds, but now includes plants as well. The last half-dozen years, especially, have seen intensive efforts to ascertain the distributions, habitats, and status of rare plants in the provincial and state, as well as national, floras of Canada and the United States. Such studies not only call attention to endangered species but assist in land-use and conservation planning by identifying environmentally sensitive areas and habitats with concentrations of rare species.

This publication represents the second phase of the study of Ontario rare plants, following "The Rare Vascular Plants of Ontario" (Argus and White 1977, *Syllogeus* No. 14, National Museums of Canada, Ottawa). The

latter, unlike subsequent numbers of this series covering the rare plants of Saskatchewan, Manitoba and the Yukon, lacked provincial distribution maps. The present Atlas does more, however, than add Ontario distribution maps to the 1977 list (based largely on published and unpublished information, herbarium searches by the authors themselves, and the opinions of various correspondents); it re-evaluates Ontario's rare plants, involving specialists for each of the different taxonomic groups. These specialists have been asked to borrow specimens of the species in their group from herbaria with Ontario plants for verification of identification, recording of label data, information summarization, and mapping. The taxonomic treatments (i.e. recognition of species, varieties, etc.) and verification of voucher specimens for locality records are those of the contributing specialists, who are most knowledgeable about particular plant groups, but the editors insure consistency in evaluation of rarity status.

Rarity status as defined here is based on both geographic (i.e. restricted area of occurrence) and demographic (i.e. low numbers wherever found) criteria. Essentially the species' numbers must be so low, or it must be restricted to such small areas in Ontario, that the plant would be potentially vulnerable to human-caused environmental changes, especially if restricted to a specialized habitat. Present information has usually allowed only the recognition of "rare" status (i.e. low numbers and/or restricted range), but the editors believe it now essential to distinguish Ontario



plants that may be truly "threatened" (i.e. likely to become endangered), "endangered" (i.e. whose existence in Ontario as a whole is under threat of immediate elimination from human activities), or already "extirpated" (i.e. no longer existing in the wild in Ontario).

The introduction to the Atlas explains the background, objectives, definitions, criteria used, format and methods, followed by cited references and three appendices, listing respectively the herbaria consulted, literature sources indicating rarity outside Ontario, and the contributing authors. The bulk of the publication consists of the separate species sheets in family fascicles with covering family title pages which list the Ontario rare species included for that family, and those candidates excluded with reasons.

Each species sheet is complete for one species, giving the scientific name, pertinent synonyms (if any), common name (when available), dot-type distribution maps for Ontario, and a line-type overall North American range map. The variously shaded dot symbols indicate the collection dates, and herbarium acronyms printed directly on the maps indicate where the voucher specimens are filed. Reference sources are printed on the North American range maps. Recording and mapping of specimens by collection dates reveal possibly declining or already extirpated species known mainly or entirely from old specimens. Below the maps are brief habitat descriptions, status elsewhere, and notes on rarity in Ontario or on taxonomic or nomenclatural problems. The text is bilingual with parallel English and French columns.

The pages of this Atlas are being published at irregular intervals in groups of family fascicles to be filed in a loose-leaf binder as they become available. This makes the information available more quickly and permits insertion or substitution of additional or updated

species pages. To date, one issue has been published with 11 authors contributing to only three Monocot families — Cyperaceae, Liliaceae, and Orchidaceae, but including a total of 95 species, due to the disproportionately high numbers of rare plants in the sedge and orchid families.

The production of this Atlas under the capable direction of Dr. Argus seems to overcome a common weakness of many such plant atlases, — i.e. an inadequate verification of herbarium records for the literature reports, although the many contributing authors may differ in taxonomic approaches. Considering that the 1977 list of Ontario rare plants included 638 species in 93 families, there is still a great deal of work before completion of this Atlas.

The mapping of North American ranges is very useful but, the extralimital ranges may, at least sometimes, be less than accurate based as they are on literature sources. Among the species in this first issue, a distortion of the Saskatchewan ranges on the North American maps was noted for the following species: *Carex heleonastes*, *C. loliacea*, *C. raymondii*, *Disporum trachycarpum*, and *Listera borealis*.

The *Atlas of the Rare Vascular Plants of Ontario* represents an important contribution to North American rare plant studies. Although it contains rare species also occurring here it could serve best as a model for the production of a similar atlas of the rare plants of Saskatchewan, or of the western provinces of interest to naturalists in the Prairie Provinces. — Reviewed by V. L. Harms, Fraser Herbarium, University of Saskatchewan, Saskatoon, Saskatchewan. S7N 0W0

EDITOR'S NOTE: Part 2 of the Atlas is now available covering the following ten families: Adiantaceae, Aspleniaceae, Asteraceae, Clusiaceae, Gentianaceae, Isoetaceae, Melastomataceae, Ophioglossaceae, Ranunculaceae and Xyridaceae.



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# LETTERS

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## DUTY-SHARING BY ROBINS

My husband and I have been observing and studying the birds and animals in our area for years. We especially find that the birds are very interesting. Within a radius of 2 miles of our home we have observed throughout the whole year at least 65 different birds including the transients.

On 7 April the bluebirds arrived and established their territory. The robins are also returning. Speaking of robins, I would like to share this happening:

Two years ago in the middle of July I noticed father robin picking Saskatoons in the bluff, 10 feet from the house. He would pick the berries and then drop them on the ground. Mother robin was right there. She just stuffed them into her mouth.

On looking a little closer I noticed that her right wing was dragging on the ground and that it was nearly severed from the body. She probably flew into some hydropower wire or something sharp to cause such a wound.

I dropped everything and followed the pair. After father robin, too, had his mouth full of berries they proceeded south to the shelter belt. Father robin all the time flew circles around mother as she hopped some 300 yards across the yard to the shelterbelt. In a spruce tree branch 6 feet above the ground was a nest containing 4 baby robins. Mother robin dropped her berries on the ground at the foot of the tree. Father robin picked them up and fed the young. When they were finished they returned to the

bluff for more berries. Father robin was constantly circling around mother as she hopped across the yard. This scene somehow touched my heart! This went on day after day.

That year I had a little garden just 10 feet from the shelterbelt. I was hilling potatoes. Mother robin hopped along the row and picked cutworms, earthworms and grubs. Her mouth looked like a hayrack with long hay hanging out the sides. She hopped to the tree and father took over.

Finally the young robins were out of the nest and were flying around. Mother made courageous attempts to try to fly, too, but every time she tried she would come to the ground. Her wing was not mended yet.

In the fall cooler weather came. Flocks of robins from the north stopped to rest in the yard, on their journey south. The young and the father left without mother.

I noticed her some weeks later. She could fly short distances but not very well. Whether she made it south I do not know. I am watching for her every day and hope she comes back. — *Annie Knight*, Box 71, Bangor, Saskatchewan. S0A 0E0



*Robins.*

*Hans Dommasch*



## NEW BLUEBIRD TRAIL

I would like to report on the success of a "Bluebird Box Trail" that we placed in Douglas Park this spring. We placed 19 boxes in the park and I am happy to report a 98% occupancy by bluebirds and Tree Swallows.

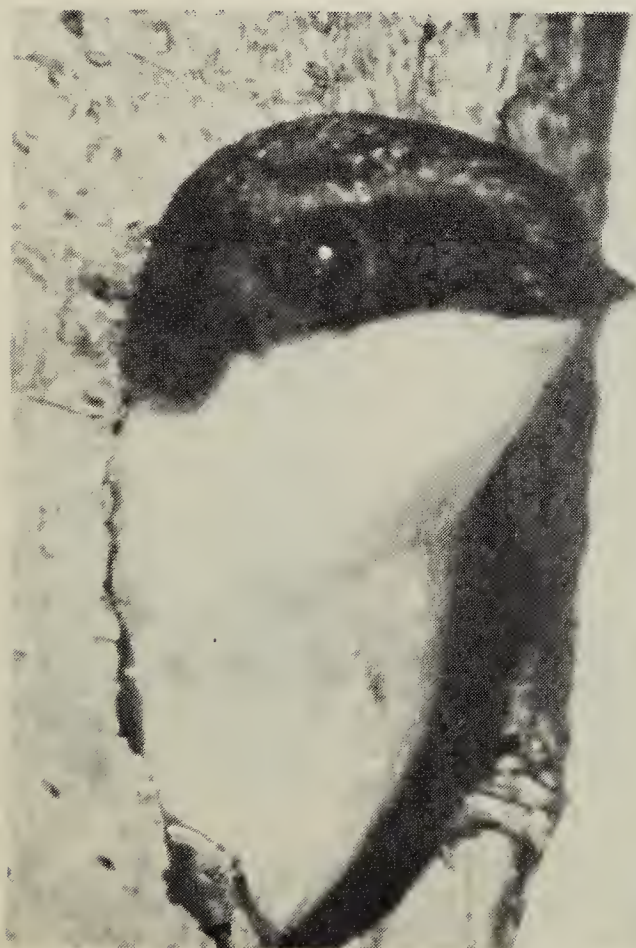
Below is a detailed list of the boxes and their occupancy. I hope to be able to return to check the hatching of swallow eggs. Another year we'll have to do our checking a little later.

I was delighted with the results and will endeavour to place more boxes next year. I operate a Home for Mentally Handicapped Adults, and it was a real learning experience for us all.

## JUNE 18 CHECK OF NEST BOX TRAIL IN DOUGLAS PARK

Box No.	Contents
1	1 dead swallow (adult)
2	6 Tree Swallow eggs
3	2 Tree Swallows hatched + 4 eggs
4	3 Tree Swallow eggs
5	4 Tree Swallow eggs (swallow stayed sitting)
6	6 Tree Swallow eggs
7	5 Tree Swallow eggs
8	7 bluebirds hatched and feathered
9	empty
10	6 Tree Swallow eggs
11	5 bluebirds + 1 egg
12	5 bluebirds
13	3 Tree Swallow eggs
14	5 bluebirds
15	3 swallow eggs seen (bird sitting on the nest)
16	5 bluebird eggs
17	6 Tree Swallow eggs
18	7 Tree Swallow eggs
19	7 Tree Swallow eggs

— Brenda D. Winch, Box 65, Ernfold, Saskatchewan.



*Tree Swallows.*

*Robert J. Long*



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# COMING EVENTS

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## SNHS ANNUAL MEETING

The annual meeting of the Saskatchewan Natural History Society will be held **October 14, 15, and 16** at **Echo Valley Centre** in the Qu'Appelle Valley near Fort Qu'Appelle. Echo Valley Centre is located at Fort San in a coulee on the north side of Echo Lake.

Guest speaker for the Saturday night banquet will be Dr. Jon Gerrard speaking on "Bald Eagles from Samuel Hearne to the present."

Sunday morning Dr. Christiansen will lead a tour along the Qu'Appelle Geolog. This will provide an opportunity to learn about Qu'Appelle Geology from the man who set up the Geolog Tour.

Accommodation is available at Echo Valley Centre. Please contact Dorothy Williams, Box 275, Fort Qu'Appelle, Sask., S0G 1S0 or phone (306) 332-4618 for reservations. Please contact Dorothy by October 1 and indicate whether you wish a single or a double and whether you require the room Friday, Saturday, or both nights.

## PHOTOGRAPHY TECHNIQUES

— Dennis and Esther Schmidt

Dennis and Esther Schmidt, originally from Kelvington, Saskatchewan, now residing in Kimberley, British Columbia, are devoted conservationists whose work reflects their love for the wild and their belief that every living thing around us has a purpose. Their photos have appeared in magazines such as British Columbia Outdoors and Nature Canada.

Mr. and Mrs. Schmidt will be presenting a slide show and talking about the photography techniques they used in producing their book *Western Wildlife* on 12 October 1983 at 8:00 p.m. in the Saskatchewan Museum of Natural History, corner of College and Albert Street, Regina. Everyone is welcome. Admission is free.







